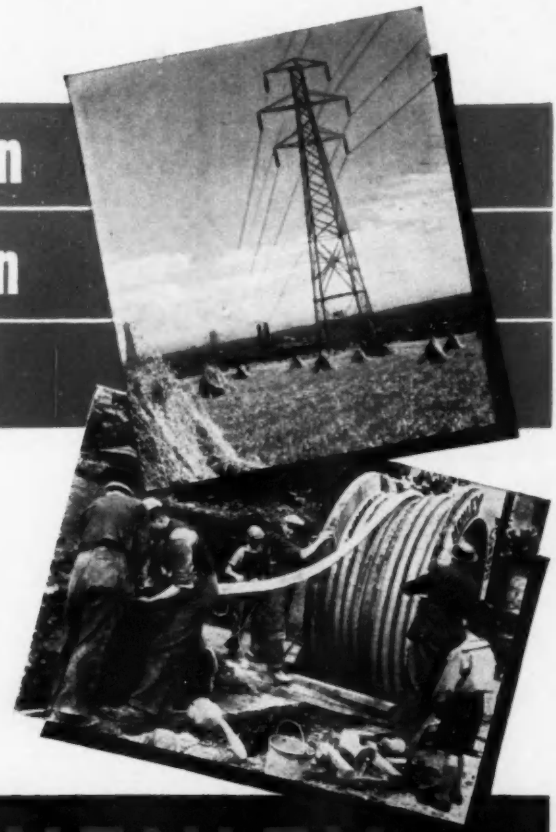
ELECTRICAL TIMES

THURSDAY
2 NOV.
1950
SIXPENCE

Specialists in Super-Tension Installations



Henley's specialise in the complete manufacture and installation of super-tension cables and accessories and in the erection of overhead transmission lines.

BY APPOINTMENT ELECTRIC CABLE MANUFACTURERS

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The 'fitting' touch to beautiful lighting schemes

EDISWAN Harcourt Decorative Fittings are the products of co-operation between artists, designers and craftsmen.
They add beauty and charm, both by DAY and night, to any lighting scheme.
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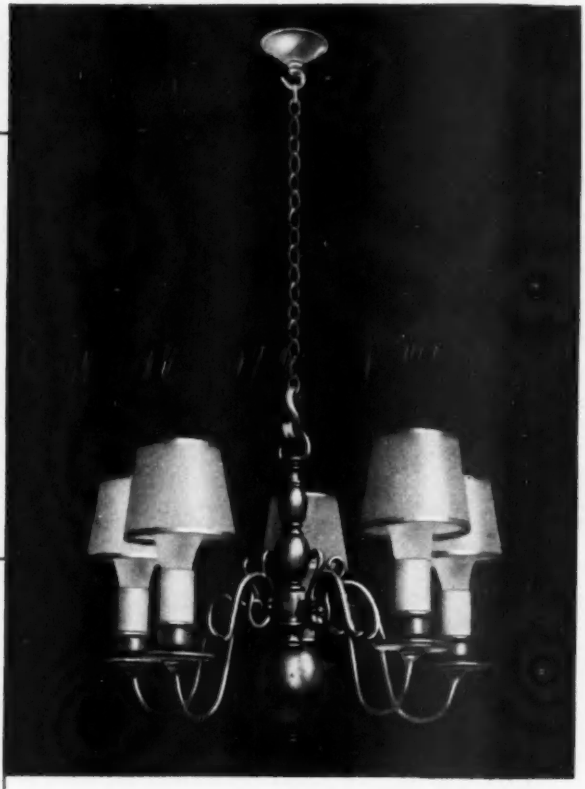

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THE EDISON SWAN ELECTRIC CO. LTD., 155, Charing Cross Road, London, W.C.2.
Branches in all the principal towns. (HL 107)

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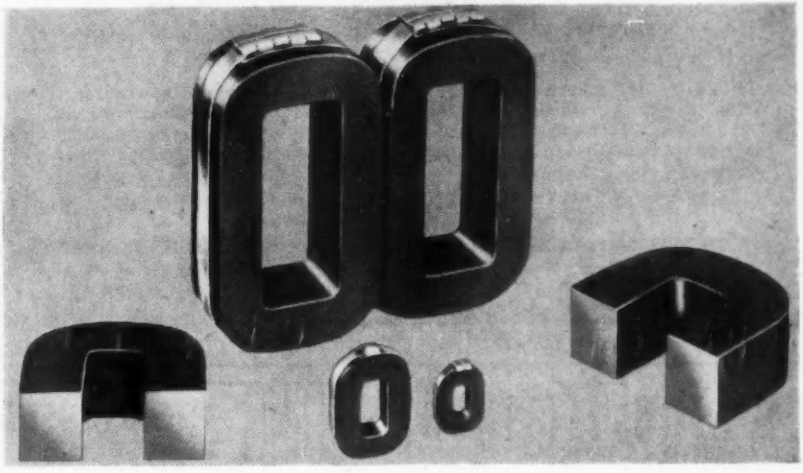

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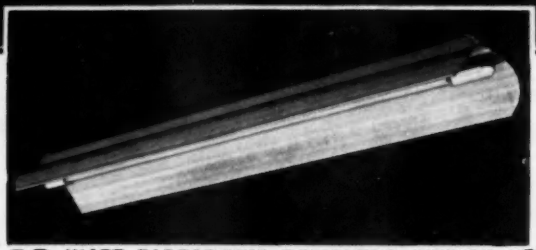

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This new Smithlite fitting, No. K.L.135 has a detachable prismatic type reflector with no less than eleven reflecting angles. The Control Gear comprising High Power Factor Ballast, Starter Switch and Suppressor Capacitor Assembly is totally enclosed and ready for immediate connection. Designed for either Chain or Conduit Suspension.

SMITHLITE FITTINGS DO NOT RUST

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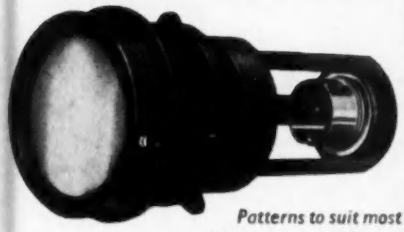

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also makers of
LIGHTING FITTINGS
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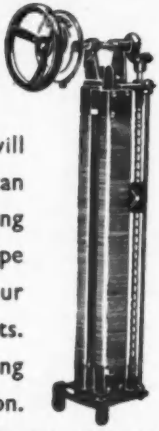

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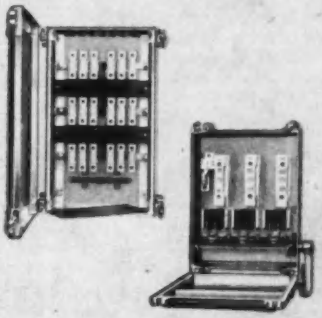

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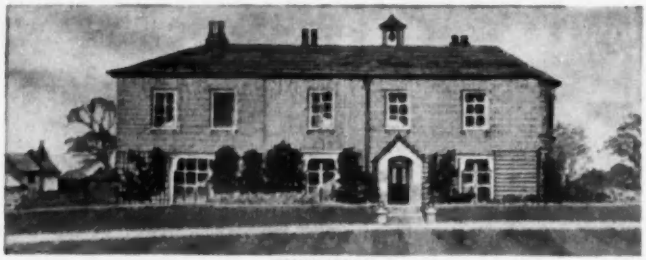

1950

OWLS HALL

The Story of BELLING *& Company Ltd.* No. 16

RUNNING into 1938 I find we made further improvements in our coal effects. We had a very big catalogue with 55 distinct fire designs. We had a range of standard cookers and Streamline Cookers and our Baby Cookers. Also Breakfast Cookers, boilers, air conditioners, air circulators, convectors, etc. Twenty-two different finishes were listed for our fires—just about enough to drive us, the wholesaler and the retailer, quite mad.

In this year I see we built our First Aid Station. We also added two more bays to our West building, which completed the block except for a space in the front. Our East and West buildings and the other separate buildings we had put up by this time totalled about 200,000 sq ft.

Mr. Hibberd, our Works Manager, joined us in this year and is, of course, still with us.

This brings us to 1939. In this year the second world war started, so that our catalogue was much the same as that for the previous year, except that I see we introduced our Visor Fire which was a very fully protected one. It had a close mesh guard, and it was quite impossible to touch any of the live parts. We also produced our Champion Heater. This was one of the most remarkably successful articles we ever made. In the first winter we sold over 60,000 of them, and they were used in great quantities for air raid shelters and similar work. This particular heater originated from some very rough ones I made up to air the rooms in "Owls Hall," which house I happened to have bought just after war had been declared, and the rooms of which I wanted to keep aired during the first month or two of the winter. These chimneypot heaters were so successful and so economical for this particular job that I had improved samples made at our Works, and started producing them as rapidly as ever possible. This actually is how this particular heater came into existence.

Incidentally, later on in 1939 we moved half of our office up to "Owls Hall" and installed them there in case of raids. As nothing of this kind actually happened in 1939, and as the rest of the office wanted to know why they also could not go up to "Owls Hall," I decided to move them all back to the Works again, and go up there and live myself.

In the meantime we had prepared shelters at the works to accommodate over a thousand people, so that everybody was satisfied. Another interesting point is that having got settled down at "Owls Hall," Mr. Alderson, Mr. Lee and Mr. Barnett (of the old North Met) joined me in living up there as it was well out in the country, whilst their families were evacuated to other parts of England.

During the raids we had one 500 lb high explosive bomb in the garden, just about 100 yards from the house, which shook us up well. On another occasion we had at least 250 incendiary bombs in the field immediately behind the house, and on another occasion we had four high explosive bombs in our fields about a quarter of a mile away. However, we all of us got through the war safely, and in due course the war damage was repaired.

Incidentally, going to "Owls Hall" to live started me up in the farming industry. Having 60 acres of land of my own and by renting 30 acres from the vicar adjoining, I was able to start up a herd of 30 milking cows. I now have another 100-acre farm in Cornwall, and a part interest in a third 100-acre farm in Wiltshire.

At the works we had 12 incendiary bombs early on in the war, 11 of which were successfully put out, but the twelfth one was hidden away in our carton storage, which it caught on fire. However, the fire brigade was soon on the spot and very little damage was done.

The next chapter will deal with our production efforts during the war period.

C. H. Belling.

Belling & Co., Ltd., Bridge Works, Enfield, Middx. Tel.: Howard 1212.

CRG16

Photograph by courtesy of the C.O.I.

THE VILLAGE Burford, in Oxfordshire, is almost the classic example of the English village. The photograph by J. Dixon Scott reveals its mellow Cotswold charm. Villages like this, rich in history and enchanting in detail of brick or stone or timbered beam, are a heritage worthy of protection.

National Corrugated Cases protect the products of the nation's great heritage of industry and trade—ensuring their safe carriage to all parts of the globe.

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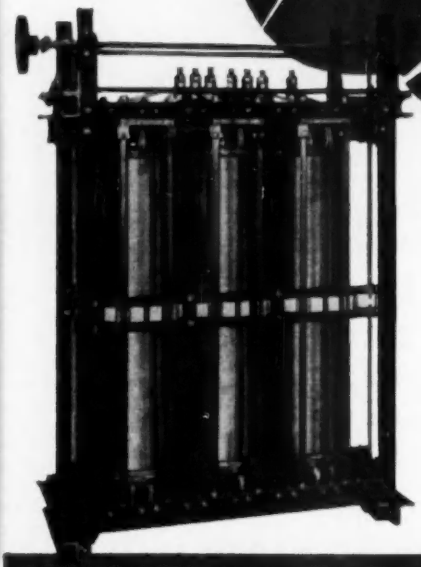

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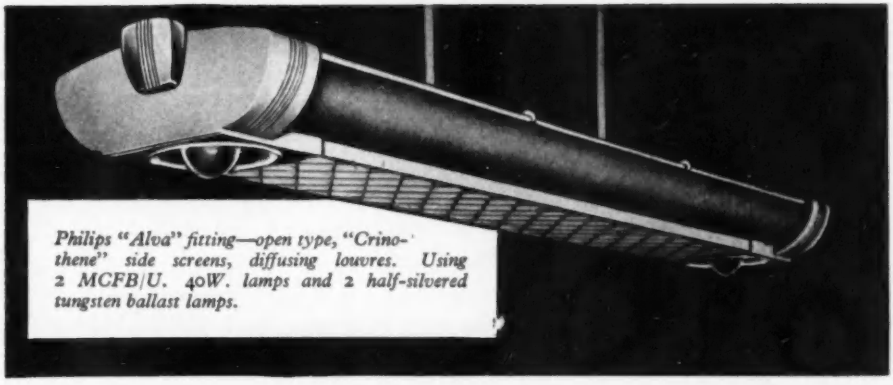
NEW PHILIPS Instant-Self-Start FLUORESCENT LAMP

WE are pleased to announce a most important new lighting development—an instant self-start fluorescent lamp operating entirely without choke, transformer, capacitor or starter.

This new lamp, a Philips development, operates in series with a Philips Coiled-Coil Tungsten Ballast Lamp — itself an efficient source of light.

- A pleasing blend of fluorescent colour, plus the "punch" of tungsten light.
- Overall luminous efficiency about double that of tungsten lamps.
- Long average life.



Philips "Alva" fitting—open type, "Crinothene" side screens, diffusing louvres. Using 2 MCFB/U. 40W. lamps and 2 half-silvered tungsten ballast lamps.

For full particulars of the Philips "Instant-Self-Start" Fluorescent Lamp, please write to:

PHILIPS ELECTRICAL LIMITED

LIGHT GROUP, CENTURY HOUSE, SHAFTESBURY AVENUE, LONDON, W.C.2

Factories in England and Holland

Makers of: RADIO AND TELEVISION RECEIVERS · LAMPS AND LIGHTING EQUIPMENT · "PHILISHAVE" ELECTRIC DRY SHAVERS, ETC.

L.748A

The "SATCHWELL" water heater thermostat type "V" represents the skill and experience gained by us in more than one-quarter of a century of thermostat manufacture.

The "V" thermostat conforms to British Standard 1555. List 102 will give you full details ; please write for a copy.

THE RHEOSTATIC CO. LTD.
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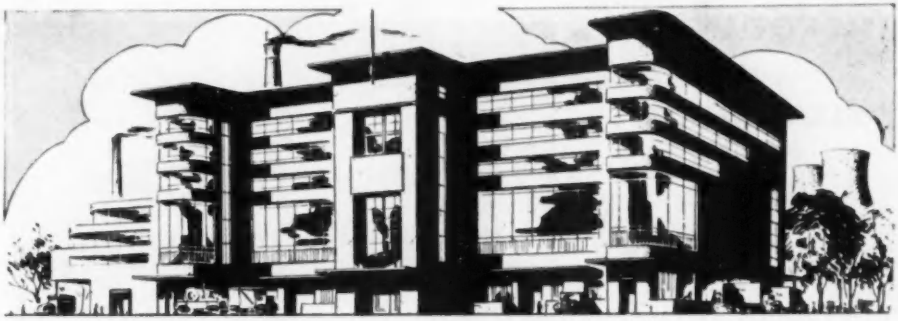
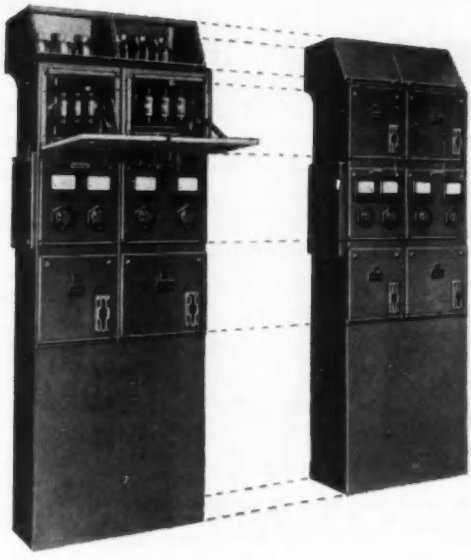


For low-voltage distribution...



BRUSH high rupturing capacity fuse Switchgear of the unit pattern with centre busbars and arranged for top and bottom cable entry

The illustration shows switchboard for 400/230 volt service, equipped with 300 and 150 ampere fuse switches

the best answer is **BRUSH**

The Brush Electrical Engineering Co. Ltd., Loughborough, England

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Model 1005

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EMINENTLY SUITABLE FOR:

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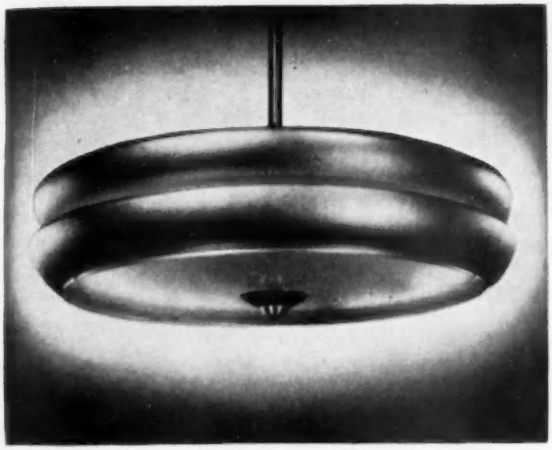

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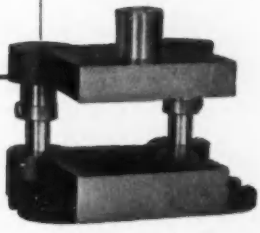

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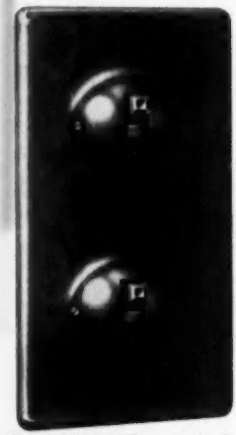
Tenby ELECTRICAL ACCESSORIES



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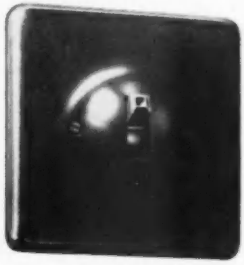
Just TENBY Quality at its very best. THE "FRIGATE" combines all the labour-saving features of the TENBY PILOT range of accessories; a heavy moulded box, plaster depth to reduce installation costs; special easy wiring terminals and a cover of exceptional strength and graceful appearance. In short an extremely robust assembly at a price which enables you to install TENBY quality in the most competitive schemes. We'll be pleased to send you details.



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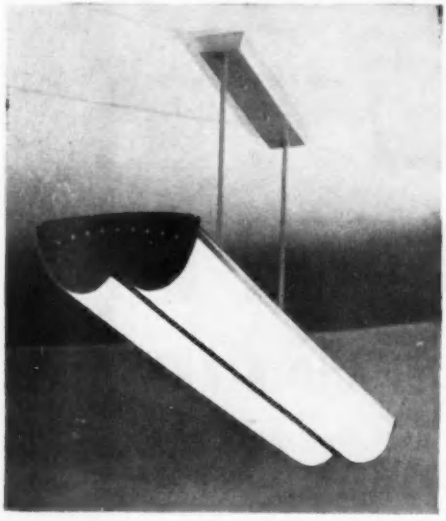
TUNGSTEN LAMP CONTROL SYSTEM

(T.L.C.)

For the smaller establishments the boon of OSRAM fluorescent lighting is made available at low cost by the introduction of the new Tungsten Lamp Control system developed by the G.E.C. The fitting illustrated employs a combination of two OSRAM fluorescent lamps and two OSRAM tungsten ballast lamps. Current consumption, A.C. mains only, 210 watts.



Advantages of the G.E.C. T.L.C. system include :

- **Pleasant blended light**
- **No expensive auxiliary gear**
- **Instant start**
- **Easy installation—no special wiring necessary**
- **Lightweight fitting**
- **Employs standard fluorescent lamps**

F30500 complete with gear, ballast and fluorescent lamps **8¼ gns.** Tax Paid

F30500 Fitting £4 14s. 8d., Purchase Tax £1 3s. 8d. extra. Transformer 16s. 0d. Two Osram ballast lamps 2s. 6d. each, Purchase Tax 8d. each extra. Two 4 ft. 40-watt Osram instant start fluorescent lamps 15s. 0d. each, Purchase Tax 3s. 11d. each extra.

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KEEP YOUR ELECTRICITY COSTS DOWN

by ensuring that you do not exceed your target maximum demand

- Time dial (5 min. resetting).
- Target setting pointer.
- Load pointer.
- Sealing device.

Instal a FERRANTI *3-Phase*

MAXIMUM DEMAND ALARM

- Advance warning of approaching maximum demand — steps can then be taken to reduce load.
- Load reviewed every five minutes.
- Large clear dial for easy target setting.
- Load pointer and time dial clearly visible.
- Substantial contacts for operating separate warning device.

Please write for List IR.7.

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Our latest broadsheet gives Electrical Traders full information respecting R.E.A.L. Plinth lighting and the sales and advertising support associated with the marketing of this new and enchanting form of floral decorative presentation

If you have not yet received your copy of "Plinth Lighting is News" communicate with us and it will be forwarded immediately.

Issued by ROWLANDS ELECTRICAL ACCESSORIES LTD., R.E.A.L. WORKS, BIRMINGHAM 18

Do your circuits operate in high temperatures? Do you face continuous renewal of cables and wires that have had the life baked out of them?

For "hot-spots" like these, B.I.C.C. can now provide Silicone Rubber Insulated Cables and Flexibles. Silicone Rubber is designed to provide reliable, stable insulation in unusually high temperatures. It remains flexible and does not bake, crack or flow. Silicone rubber insulating tubing can also be offered.

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Boiler gauge light connections. Thermo-couple leads. Connections for rheostats, furnaces, flue motors, electric ranges, stoves, electronic equipment and commercial radio apparatus. Turbo-jet engine leads. Film projector connections. Insulating sleeves for radio.

Write for Publication No. 261W.

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ATLAS 5 FT. BATTEN FITTING

A basic all-purpose lighting unit, it has proved itself sturdy, economical, and efficient under all conditions.

PRICE £5 3 0
Including Control Gear

FB/0081.
5 ft. 80 watt Batten fitting.
Pleasing end covers and modified swallow type reflector give this fitting a distinct individuality. The welded chassis ensures strength and rigidity. Access to control gear is simple. (The Atlas 'Quickstart' unit for immediate lighting can be supplied if required.)

ABG/0081. Diffusing attachment.
This can be purchased separately and is easily fitted to FB/0081 as shown. The ribbed glass mouldings lend added distinction to a fine lighting unit.

ATLAS

FLUORESCENT

PUBLIC · INDUSTRIAL · DOMESTIC

230

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Will there have to be another Operation ?

The use of McKechnie extruded sections appeals to the astute designer who aims to cut down operating costs. The contacts of this Reyrolle fuse-carrier, for instance, are made from a single extruded brass section. The versatility of brass and bronze alloys, the limitless variety of extruded shapes, and their application by McKechnie metal technique are gradually reducing the number of operations in industry

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Outstanding features of this equipment.

- **Exceptionally smart appearance and finish.**
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- **Indicating instruments of high accuracy.**
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- **Starting-current testing without interfering with other routine tests.**

Typical Testing Rack for Polyphase Meters

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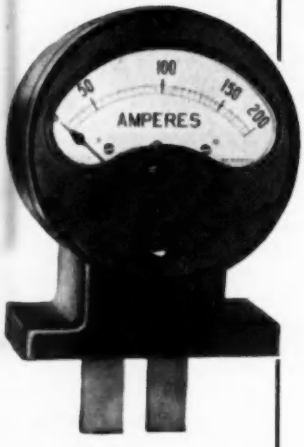

MIP

PULLIN *CONTROLLER-TYPE INSTRUMENTS*

(4" Dial, 3½" Scale)

AC/DC MOVING IRON, RANGES FROM 5 amps UP TO 300 amps. Self-contained. DC MOVING COIL, STANDARD RANGES, AMMETERS WITH EXTERNAL SHUNT.

Specially designed for use on control gear or switch boxes. Black finish cast-iron case. Protected front, strip terminals. Base 2¾ ins. by 5¼ ins. can be drilled with 2 or 4 fixing holes to suit individual requirements.

MOVEMENT (both types) Spring controlled, well damped, with pivots mounted in spring loaded jewel bearings.

A feature of the Pullin Moving Iron Controller instruments is the almost linear scale. Overload compressed scales can be supplied when required.

For prices and full details, write to:

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Rythmatic Control enables domestic water and space heating loads to be transferred from peak to non-peak periods without interfering with industrial requirements at any time.

More units are sold, additional "off-peak" load is accepted and a more economical level of operation is maintained with existing plant.

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RYTHMATIC ripple control equipment

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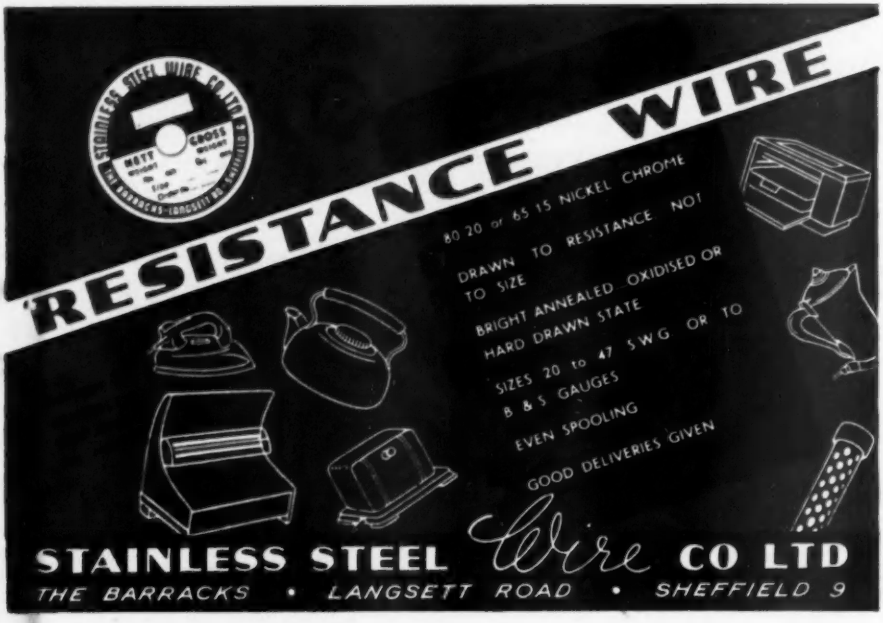
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EVEN SPOOLING
GOOD DELIVERIES GIVEN
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THE BARRACKS • LANGSETT ROAD • SHEFFIELD 9

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PUSH BUTTON
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MOTOR STARTERS

¼ to 5 h.p.
one, two and
three phase

PRICE
42/-
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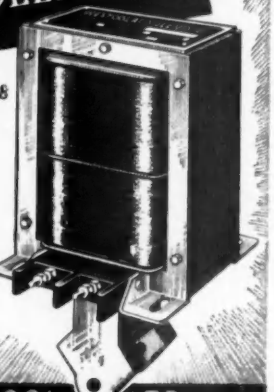
COMPACT & RELIABLE

Plunger weight 1·06 lb
Total Weight 6·5 lb
Firing centres 2" x 3⅛"
Max. Pulls 10, 15 or 20 lb
Max. stroke 2"



WESTOOL LTD.
ST. HELENS AUCKLAND, CO. DURHAM
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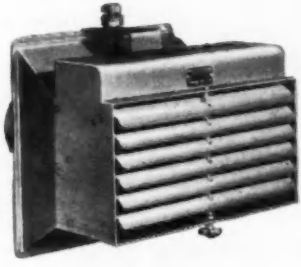
It's an ill wind . . .

that slows production



Maintenance of even normal production during the winter months is difficult — peak production almost impossible — without a well planned system of space heating in the factory.

The thoughtful works manager chooses the system which needs no boilers, no handling or storage of fuel ; the system that eliminates the need for floor space and constant attention.

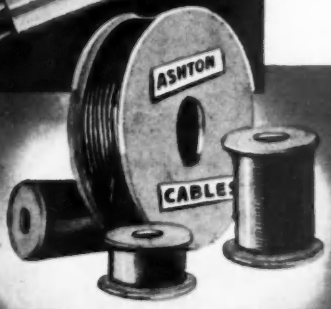
He chooses G.E.C. ELECTRIC UNIT HEATERS.

The Industrial Heating Department of the G.E.C. maintains a comprehensive planning and advisory service which is available at all times for consultation.

ELECTRIC UNIT HEATERS BY G.E.C.

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Wherever ELECTRICITY *is used*



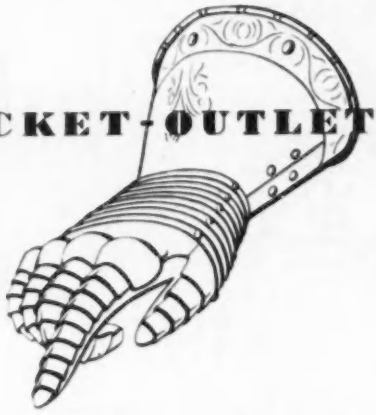
In every department in the works, and on every electrical installation, ASHTON CABLES are serving industry well. Laboratory tested at every stage of manufacture, ASHTON CABLES are thoroughly dependable under the most trying conditions, and can be relied upon to give faultless service for years to come.

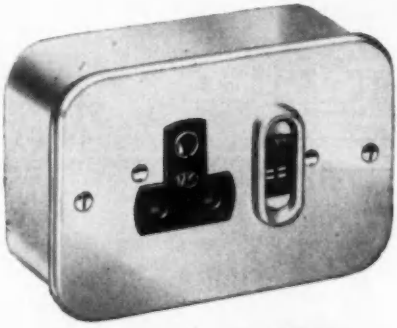
ASHTON CABLES are manufactured to B.S.S. No. 7, 1946. Amendment No. 3, August, 1949. P.D. 947.

ASHTON
Cables + Flexibles

AERIALITE LTD, STALYBRIDGE, CHESHIRE

M.K. METALCLAD SWITCHSOCKET-OUTLETS





Introducing a new range of metalclad switchsocket-outlets and plugs of remarkable value. They incorporate the latest type of A.C. switches, shuttered sockets, and are mounted in pressed steel boxes. Leading features include A.C. type switches incorporating pure silver contacts. Simple and reliable shutters with snap action. Boxes made in one piece from zinc-coated steel, bonderized and finished aluminium. Four $\frac{3}{4}$" knockouts, one on each side. Front plates — protected type, aluminium finish. Domestic type, brass, finished matt bronze. Bases, urea moulding of non-tracking type.

M. K. ELECTRIC LIMITED

WAKEFIELD STREET · EDMONTON · LONDON · N.18

Telephone : Tottenham 5151 (6 lines). Telegrams : Multiconta, Southtot, London

A.31

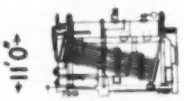
PROGRESS

	EVAPORATION LB/HR	PRESSURE LB/SQ. IN.	TEMPERATURE °F
1890	3,700	100	330
1910	22,000	215	570
1930	260,000	840	850
1950	540,000	950	940

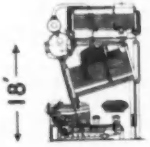
BABCOCK & WILCOX LTD.

BABCOCK HOUSE, FARRINGDON ST. LONDON EC4.

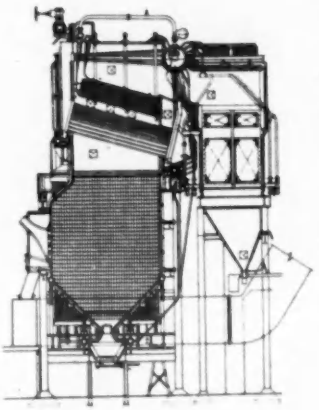
1890



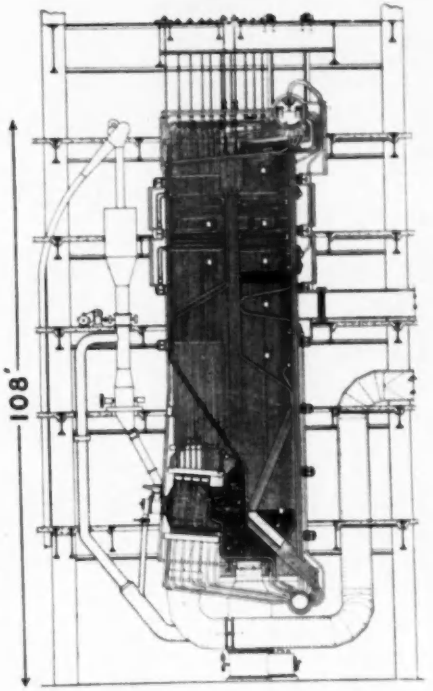
1910



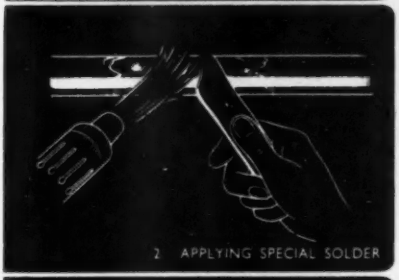
1930



1950

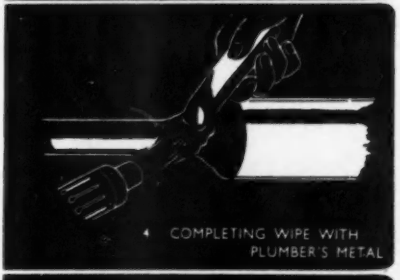


1 REMOVING OXIDE FILM

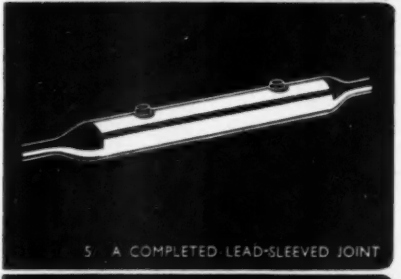


2 APPLYING SPECIAL SOLDER

3 BRUSHING-IN MOLTEN SOLDER



4 COMPLETING WIPE WITH PLUMBER'S METAL



5 A COMPLETED LEAD-SLEEVED JOINT

6 WIPE WITHSTANDS SHEATH BREAKING LOAD

SIMPLE WIPING TECHNIQUE

For Jointing J. & P. SEAMLESS ALUMINIUM SHEATHED CABLES

British patent Nos. 627815, 627793

The use of a special solder for the initial tinning of the aluminium sheath enables wiped joints to be made by normal plumbing methods using standard plumber's metal and lead or copper sleeves. Excessive heat is eliminated and flux is not required.

The new technique developed by J. & P. Research Staff comprises the following operations:

1. Cleaning with a fine file to remove oxide film.
2. Tinning with special solder applied in stick form. No flux used.
3. Brushing-in molten layer of tin to remove any remaining oxide and to promote thorough amalgamation with aluminium.
4. Wiping with standard plumber's metal by normal methods.

Wiped joints made by this method have been thoroughly tested in the J. & P. laboratories. Tensile loadings applied to 1¼" dia. cable wiped into glands have reached values of the order of 2,600 lbs. at which the sheath itself has failed.

Another development by

JOHNSON & PHILLIPS LTD.

CHARLTON · LONDON · S.E.7

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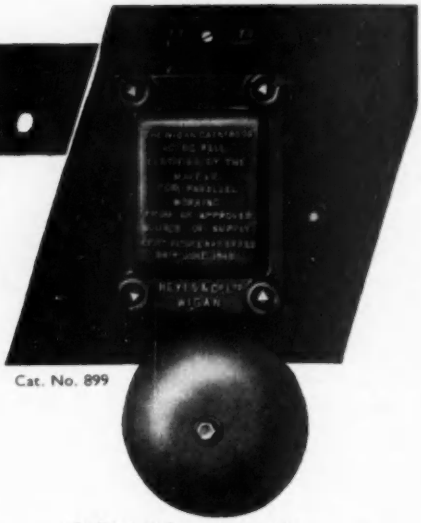
★ *A leaflet giving details of recent developments in connection with aluminium cable is now available to interested engineers.*

Signals . . .

The "Wigan" universal bell illustrated is interchangeable, operating on either A.C. or D.C. systems without modification. The current consumption is extremely low, allowing 20-30 bells to be operated in parallel.
The unit is constructed of cast iron with machined faces, and the lid is secured with shrouded screws to prevent tampering.



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HEYES & COMPANY LIMITED, WATER HEYES ELECTRICAL WORKS, WIGAN

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Blackley AND Limpel

ADHESIVE ELECTRICAL INSULATING TAPES

The properties of insulation and adhesion found in Connollys' range of Insulating Tapes provide unsurpassed quality, backed by over fifty years of manufacturing experience. Manufactured in ½in., ¾in., ¾in. and 1 in. widths, in 5, 10, 25 and 50 yard reels.

"BLACKLEY." The original and the best, manufactured in white only. "LIMPET." The finest black tape obtainable.

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5248K

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Creda
electric kettle

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easy-access filling—
striking shock resisting plastic handle gives clearance over lid, easy pouring and carrying. 3¼ pint capacity body and handle are of registered design

steam vents protect hand—
vents in lid knob direct steam towards spout, away from hand. Lid locks under the handle and remains safely in position at any angle

connector inset at back—
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quick boiling—
3 pints of water can be boiled in 7 minutes! 1500 w sheathed immersion-type element. Three bakelite feet protect polished surfaces

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MADE BY THE HOUSE OF Simplex

Simplex Electric Company Limited
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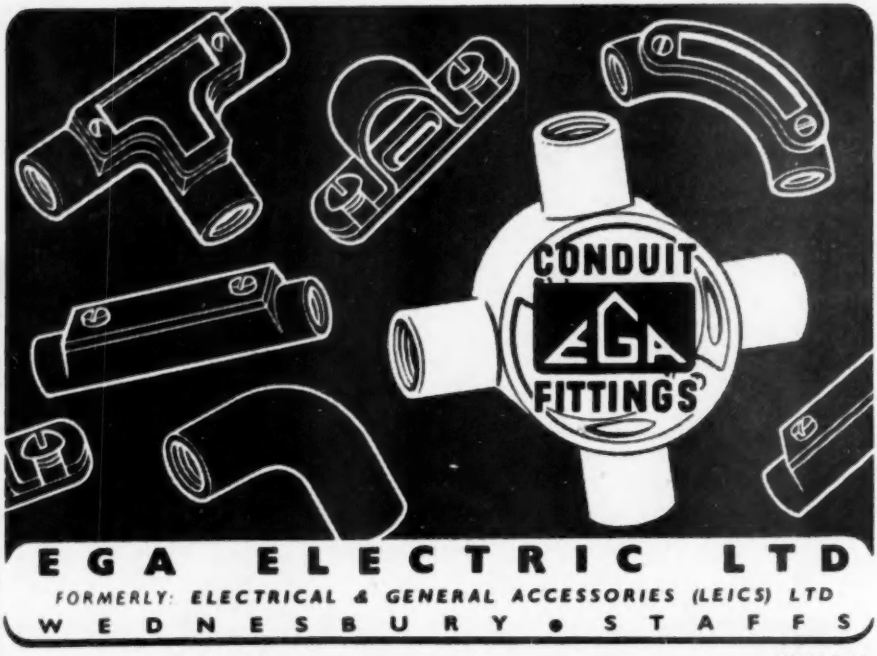

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CIRCUIT BREAKER

TYPE S 121

ONLY 1½" WIDE x 4⅜" HIGH

For power and lighting circuits
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Neutral link
High rupturing capacity

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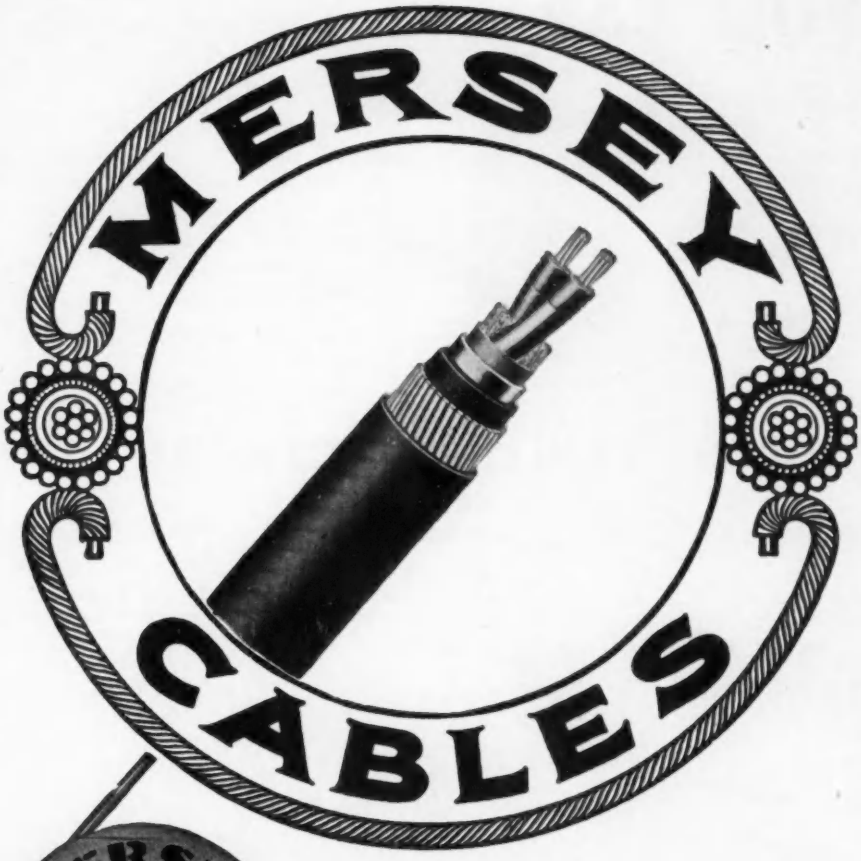
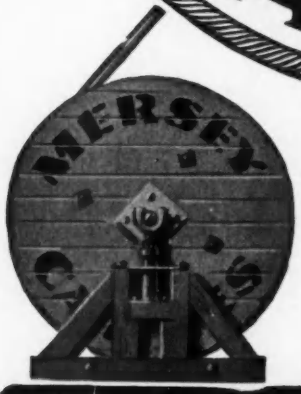




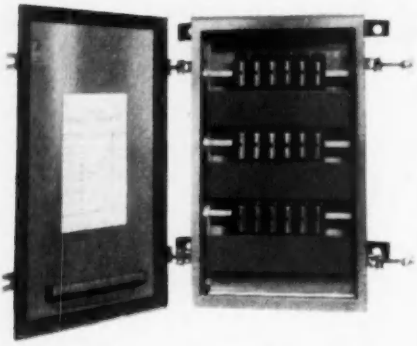
All Sizes of rubber insulated wires, cables and flexibles are made under the famous MERSEY name. *Illustrated is a 7/.036 Twin Circular V.I.R. Insulated, Taped, Lead Alloy Sheathed, Bedded, Single Wire Armoured, Jute Braided and Compounded 660 volt Grade Cable. To B.S. — No. 7/1946.*

STOCKED AND DISTRIBUTED BY ALL BRANCHES OF **SIMPLEX ELECTRIC CO., LTD.**

Manufactured by MERSEY CABLE WORKS LIMITED, LINACRE LANE, BOOTLE, LIVERPOOL. *BOOTLE 2777-8-9*

A TI COMPANY

PULL CAP *distribution fuse boards*



- Equipped with Pullcap 440 volt fuse fittings complying with BS88 1947.
- Cases are of heavy gauge steel, welded construction of rigid design.
- **Doors can be swung left hand or right hand as required without special adjustment.**
- All live parts completely shielded.
- Provision for isolators, glands, sealing chambers or conduit holes can be included as required.

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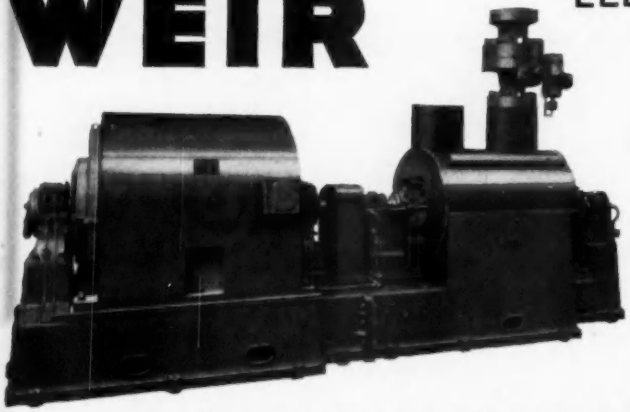
ELECTRICALLY DRIVEN

BOILER FEED PUMPS



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:: CATHCART : GLASGOW ::

it sells itself . . .

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B.N.E. *Model C.49*

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Rotella (or Umbonium) Gigantea, the "Giant Little Wheel" shell, is large only in comparison with others in the same genus—it is only a little over an inch in diameter. Rotella Gigantea has a smooth shell, slate coloured or reddish, with attractive black and white spots on the lower part. It is found off the coast of Japan.

Shell Rotella Oil and Shell Talpa Oil are part of the range of Seashell Oils, all of which are named after Seashells.

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SHELL ROTELLA OIL

SHELL TALPA OILS are specially refined mineral oils for I.C. engines of all types, including oil, gas, petrol and kerosene engines; also for most reciprocating and vane-type compressors for which straight mineral oils are suitable. They possess high oxidation stability, low carbon-forming tendencies, and natural detergent properties.

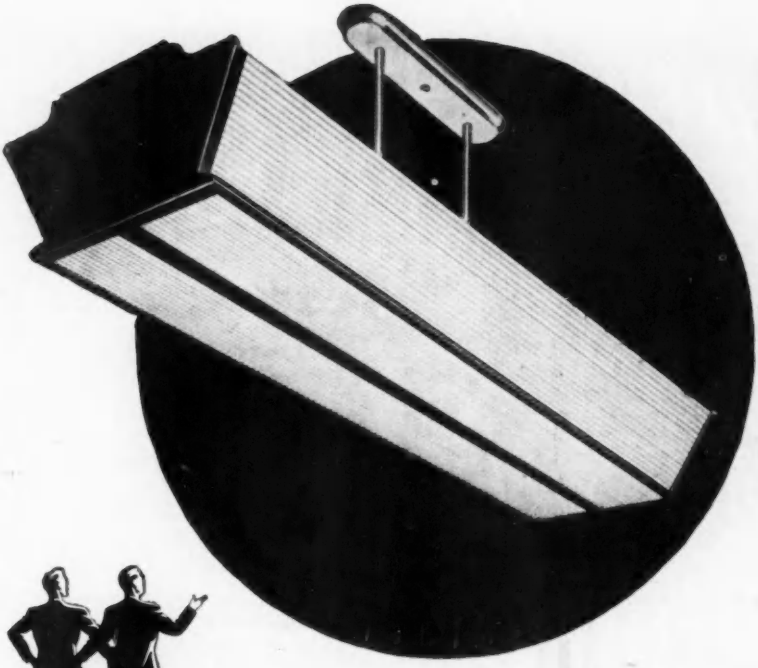
Shell Rotella oils are "Heavy Duty" grades, designed especially for the lubrication of high speed, high rated oil engines. They contain additives that impart detergent, anti-oxidant, anti-wear and protective properties of a high order.

The Seashell range of specialised industrial lubricants, which includes Shell Talpa Oil and Shell Rotella Oil, is marketed in nearly every country of the world. There is a Seashell grade for *every* industrial use—and each grade is available everywhere in the same high quality.

SHELL **LEADERSHIP IN LUBRICATION**

SPECIALISED RESEARCH FOR EVERY INDUSTRY

In common with all Shell Oils, Seashell Oils are produced as the result of *world-wide research*. At Shell's great Thornton Research Centre, and at other Shell Research Centres in Europe and America, scientists and technicians spend their lives studying and testing the special lubrication needs of every branch of industry. The products of this research are the Seashell Oils—each one developed to solve a *specialised* lubrication problem. This is the solid basis upon which the Shell Organisation have built up their world-wide *leadership in lubrication*. Shell lubrication engineers will be pleased to provide further information about Seashell Oils and to make specific recommendations for particular purposes.



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Some features of design are :—

- PANELS of special diffusing fluted glass.
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- CONTROL GEAR self-contained high power-factor pattern completely assembled and wired in the fitting.
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- LAMPS, 4 × 40w. Crompton fluorescent tubular lamps.

There is a Crompton lighting fitting and lamp for most places and a Crompton lighting engineer to serve you in every place.

Built to better purpose by

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BY APPOINTMENT MANUFACTURERS OF ELECTRIC LAMPS TO H.M. THE KING

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B

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POCKET SIZE
MULTIMETER

TAYLOR'S new pocket size multimeter is the first instrument in the inexpensive field that has been specifically designed to provide all the following features. . . .

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CIRCUIT TESTS — Self contained battery, for quick continuity testing.

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SIMPLICITY — No complicated switching. Foolproof range selection by plug and socket.

CONVENIENT POCKET SIZE — Small . . . compact . . . handy . . . without sacrifice of performance. Size $3\frac{3}{4}$ x $3\frac{1}{16}$ x $1\frac{7}{16}$ ins. Weight 8 oz.

The ideal instrument for electricians, garage hands, amateurs, students and beginners in radio.

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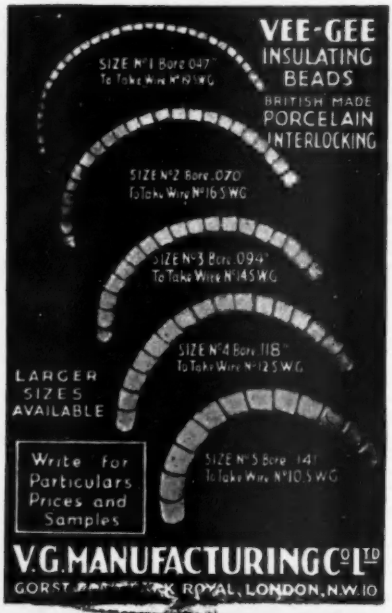
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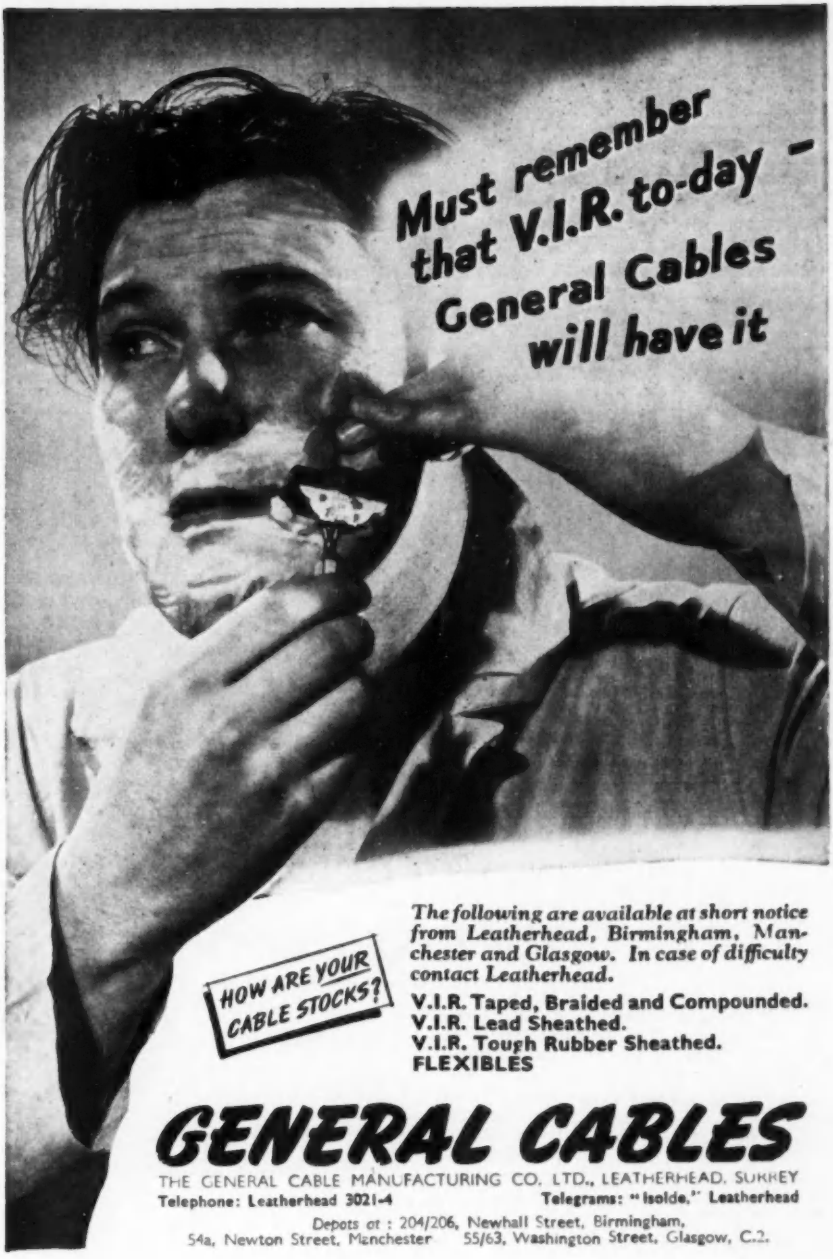

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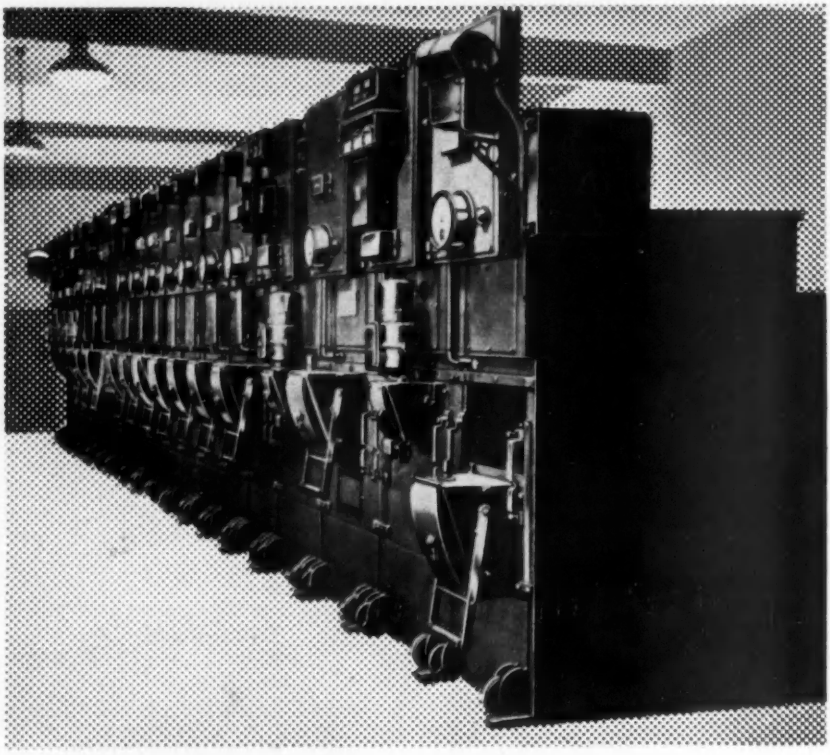

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ELECTRICAL TIMES

Vol. 118 No. 3078 THURSDAY, 2 NOVEMBER, 1950

PUBLISHED EVERY THURSDAY

SIXTIETH YEAR OF PUBLICATION

CONCRETE POLES IN SOUTH AFRICA *by G. H. Lautenberg* 687

SPUN CONCRETE POLES FOR 66 AND 88KV TRANSMISSION *by I. de Villiers* .. 690

CHOKELESS FLUORESCENT LIGHTING
by J. Cates, B.Sc., F.Inst.P., and E. E. Miles, B.Sc., A.Inst.P. 692

OUR READERS' VIEWS 694

TARIFF PROPOSALS—A CHALLENGE 695

NOTES ON WIRING *by Megohm* 696

MAINTENANCE METHODS—NO. 3 697

STRAIN GAUGE MEASUREMENT 698

PROBLEMS AND PRACTICE IN ENGINEERING 699

SAFETY IN FIRES 701

TROLLEYBUSES FOR URUGUAY 701

I.E.E. LOCAL CENTRES 702

USE RESEARCH SPEEDILY (I.E.E. SUPPLY SECTION) 703

OVERSEAS NEWS 704

PERSONALITIES IN THE INDUSTRY 706

THE DAIRY SHOW, 1950 708

THE BUYER'S COLUMN 709

LIGHTING THE STAGE 711

THE WEEK IN NEWS 712

Questions in Parliament 716

Cases in Court 717

Electric Supply News 718

Company Activities 719

COMMERCIAL INFORMATION 720

CLASSIFIED ADVERTISEMENTS 45

INDEX TO ADVERTISERS 54

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B T-H

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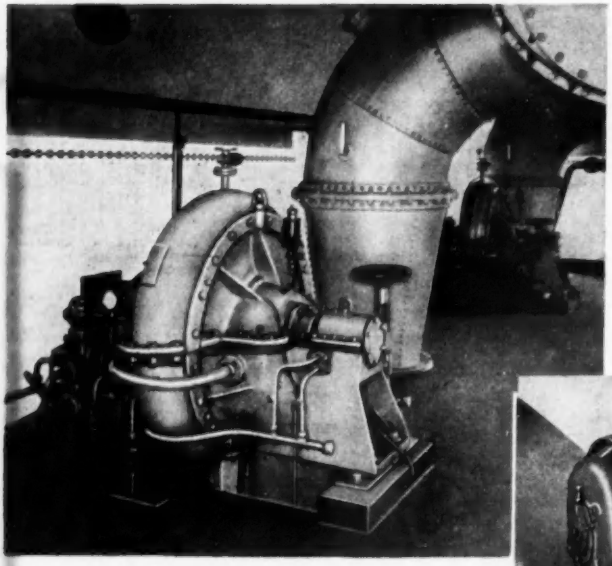

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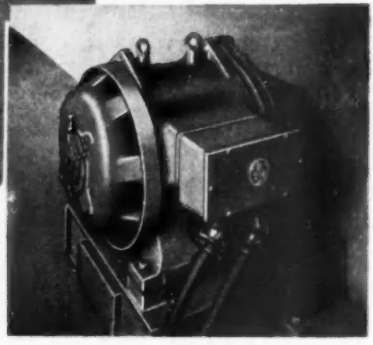

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Editorial

TARIFF INCREASES

THE announcement that two area boards intend to raise their domestic tariffs is one which will be received with apprehension by consumers within the areas affected, particularly as some areas are planning reductions! The first increase in tariffs, nine months after vesting, had reasonable justification, later came the unfortunate Clow variations, and to raise tariffs now, when tariff standardisation makes likely yet a further adjustment in another year or so, is to give consumers a picture of a never-ending spiral of rising prices. The reason advanced by the two Boards for these increases, is the estimated loss in the current year caused by rising costs, particularly the higher B.E.A. tariff. But without figures available for the past year, and limited estimates for the current one, these are very much *ex parte* statements which make no reference to possible economies by judicious pruning of expenses. In a monopoly such as electricity supply, a deficit can too easily be accepted as justification for an increase, but first the organisation should be tested on the anvil of business efficiency. Unfortunately there is no simple direct test, nor does the 1947 Act provide means for an indirect one. In the absence of any body fulfilling the role of the former Commissioners, the responsibility is placed squarely on the shoulders of the Central Authority for seeing that any increase above the national average cannot first be met by greater economy of operation.

EASTERN COUNCIL ACTS

ONE of the first results of the proposed increase in tariffs has been a clash in the Eastern Area between the Consultative Council and the Board. The Council consider the increase ill-timed, and have decided to exercise their statutory right to make representation to the Central Authority. As the first appeal of this type, the occasion is one of historic significance to all nationalised industries, coming as it does when even some of the most ardent supporters of nationalisation are critical of the adequacy of the present form of consultative council in representing the interest of consumers. To take such a step has needed great courage, since it is the first break in the hitherto amicable relations, and the position of the Chairman as an *ex officio* member of the Board is no enviable one. The subject of the appeal is unfortunate, for although the Council are unquestionably carrying out their statutory duty of consideration of variations in tariffs, this general increase has wider implications which are a matter for the Board alone, but in the absence of a definition of the border line of responsibility in such cases, the Council could not well do otherwise than appeal.

FINANCIAL AUTONOMY

THE resolution of the Eastern Consultative Council appealing to the Central Authority is based on a report by the General Purposes committee which appears to have been well informed. Indeed, the statistics presented in their report are in greater detail than those in the Board's own statement, and this confirms that there has been a full interchange of information. The committee, in opposing the tariff increase, no doubt felt impelled to suggest an alternative means of balancing the estimated deficit, but in proposing that the central reserve fund should be used for this purpose they are unquestionably going beyond their terms of reference. However, in raising this matter, they are in fact asking for a ruling whether Area Boards are to be operated as financial entities, or

whether the central reserve fund is to be available as a buffer to Area Board accounts. While the former is unquestionably the most desirable policy to pursue, it will inevitably entail hardship on consumers in those areas which suffer inherent economic handicaps. The use of the central reserve fund for this purpose is quite permissible, since the 1947 Act requires no more than a balance of the combined reserves of electricity boards, but it is not easy to see conditions developing in which certain area boards receive a semi-permanent subsidy at the expense of others.

THE CHOKELESS FLUORESCENT

THE introduction of tungsten lamps as ballast resistances for fluorescent lamps is reviewed elsewhere in this issue, and details are given of the methods adopted by two of the leading lamp manufacturers. As will be seen, they differ widely in their approach to the problem, one using a standard lamp while the other prefers a non-standard lamp and a simpler circuit arrangement. In addition, their methods of utilising the light output from the ballast lamp are quite different. Whatever the respective merits of their systems—and one can foresee that there will be no small discussion on this point—both manufacturers are to be congratulated on their enterprise in marketing this new development, which we regard as a notable effort towards extending the use of fluorescent lighting into fields of application where the cost of the auxiliary gear has hitherto presented a formidable barrier to its adoption.

FLUORECONOMICS

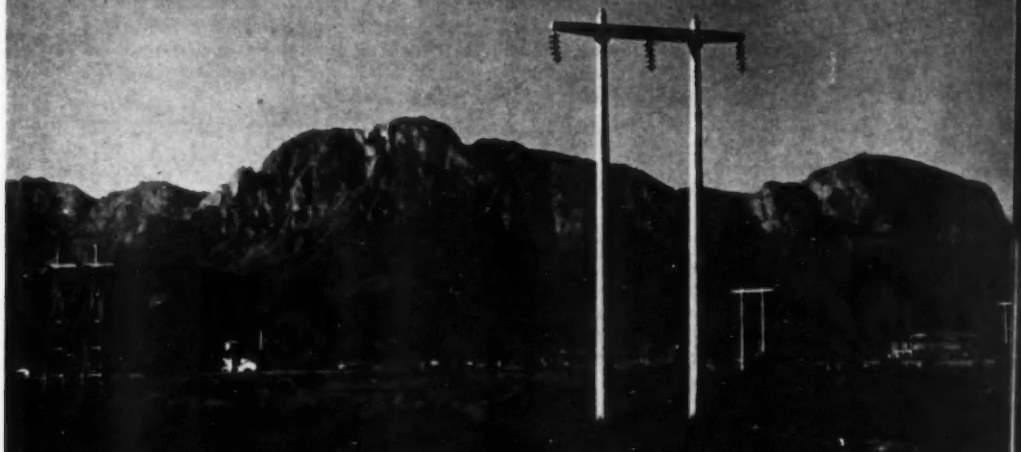
IT must, however, be realised that both these methods should be regarded as an extension of the use of fluorescent lighting, and not a competitor of more conventional auxiliaries. The use of tungsten ballasts should have a considerable effect upon the sales of fluorescent fittings for smaller commercial establishments and domestic use, where first cost is the major consideration and efficiency is of secondary interest. The average householder would like fluorescent lighting, but it is useless to pretend that the annual saving in energy would pay for the installation of a fitting costing anything from ten to twenty pounds. On the other hand, it is equally pointless to advocate tungsten ballasts for industry. It was stated by Mr. W. J. Jones of E.L.M.A. some three or four years ago, that a complete change-over of the country's commercial and industrial lighting load to fluorescent lighting would, in effect, release a power station the size of Battersea to cope with the power load. While the industrialist may be indifferent to this type of reasoning, he can readily see that fluorescent lighting may so reduce his lighting load as to pay the annual capital charges on an installation by the amount saved not only on consumption, but on maximum demand charges. In this case, first costs of the installation are of secondary importance to the running charges, and if efficiency enters largely into calculations, conventional auxiliaries can hold their own.

COMMON COLOURS

ONE imagines that those who planned the lighting system of the new House of Commons Chamber took care to avoid any colour effects that might have had political associations. "Meteor" can vouch for their success from his own observations—no trace could be noted of any blue or pink effulgence, and even any hint of yellow was successfully avoided by using fluorescence rather than incandescence. Now, we understand, there are complaints from Members that they look greenish when the lights are in use. What will satisfy them? Perhaps application of the full possibilities of cold cathode technique, with a tube for every Member, coloured for his political belief and adjustable for his feelings on the matter under debate might provide the best compromise. Established Parliamentarians would come to recognise the mood of the House from a glance at the resultant illumination, there would be a new way of catching the Speaker's eye, and watchful pressmen would find a new set of metaphors ready-made for use.

Meteor

CONCRETE POLES



IN SOUTH AFRICA

Manufacture and Properties

By G. H. Lautenberg*

PREVIOUS articles** in the ELECTRICAL TIMES have dealt with the design and properties of pre-stressed concrete poles. These articles were read with great interest in this country, and it is felt that some notes on South African practice in the manufacture and use of concrete poles would be equally interesting to readers elsewhere. The company with which the author is connected manufactures hollow circular reinforced poles by the spinning or centrifugal casting process.

Manufacture

For those unfamiliar with spun concrete manufacture, it should be explained that the process consists in pouring a given quantity of concrete into a steel or wooden mould, which is rotated at high speed, thus throwing the concrete towards the wall of the mould by centrifugal action. This not only makes possible the production of hollow poles, but, by its compacting action, results in a dense, strong concrete, well united with the reinforcement, the action being similar to tamping or vibrating a stationary mould. By varying the amount of concrete put into the mould, the wall thickness can be adjusted. After a short time the spinning is stopped and the concrete steam-cured for a few hours before being removed from the mould and allowed to mature in the normal manner.

The spinning is done on a universal machine, capable of producing a wide range of poles. Length varies from 19 ft to 42 ft, with top diameters from 4½ in. to 8½ in., and corresponding butt diameters of 7½ in. to 20 in. The poles produced have a uniformly tapering bore, and a uniform wall thickness.

Strength of Poles

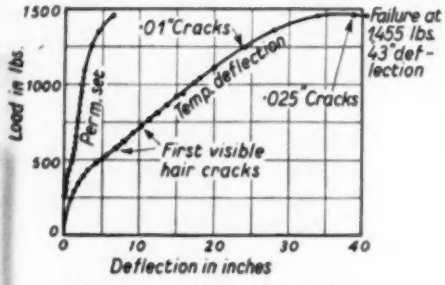
The uniform wall thickness is, of course, responsible for the unique property of the spun

* General Manager, Superconcrete Manufacturing and Construction Co., Ltd., Johannesburg.

** "Pre-Stressed Concrete Poles," F. Walley, M.SC., A.M.I.C.E., and the Essex Sub-Area of Eastern Electricity Board, ELECTRICAL TIMES, Jan. 5, 1950, p. 5.

circular pole, in that it has an equal load-carrying capacity in any direction. The reinforcement used consists of cold drawn steel wire with a minimum tensile strength of 80,000 lb/sq in. and a yield point of 64,000 lb/sq in.

Type tests carried out on various poles are shown in Figs. 1-4, which cover poles from 24 ft to 42 ft 6 in. in length, containing from 4·5 to 25·5 cu ft of concrete and 55 to 330 lb. of reinforcing steel, the ages of the poles varying from 14 to 40 days, and engineers may judge the satisfactory performance from the temporary and permanent deflection curves and the maximum deflection at which failure occurs. Other particulars of the poles are summarised in Table I.



30'-0" Pole – Lever arm = 21'-6"
Dia. at support = 11"
Max. bending moment = 31,220 lbs/ft.
Age of pole = 14 days

Fig. 1

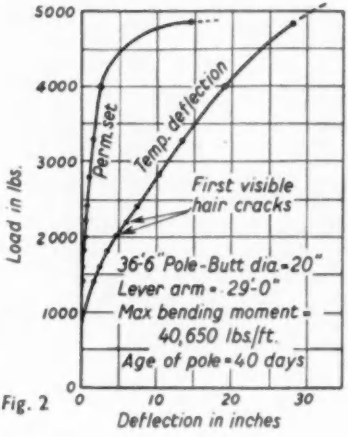
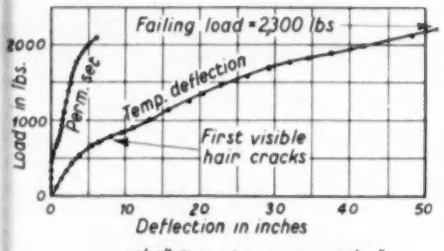


Fig. 2



40'-0" Pole – Lever arm = 33'-6"
Dia. at support = 14⅞"
Max bending moment = 79,000 lbs/ft.
Age of pole = 20 days

Fig. 3

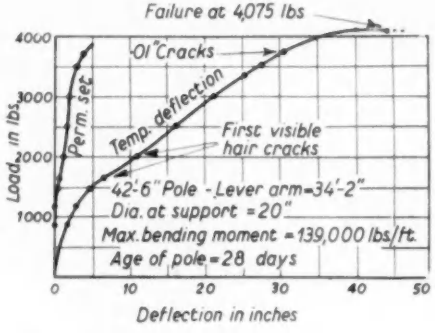


Fig. 4

Table I. Properties of spun concrete poles

Type	I		II	III	IV	Remarks
Length ft.	24'	30'	36'-6"	40'-0"	42'-6"	All steel used: Cold drawn steel wire (bright nail wire) of minimum specification: Tensile strength lbs/ins.² 80,000 Yield point lbs/ins.² = 8 x tens. str. Tolerance on weights = 5%
Concrete ft.³	4·5	6·3	21·0	12	25·5	
Steel lbs.	55	82	275	265	330	
O/all weight lbs.	650	950	3,020	1,760	3,750	
Top dia ins.	5"	5"	8½"	7"	8½"	
Butt dia ins.	10½"	11⅞"	20"	16"	20"	

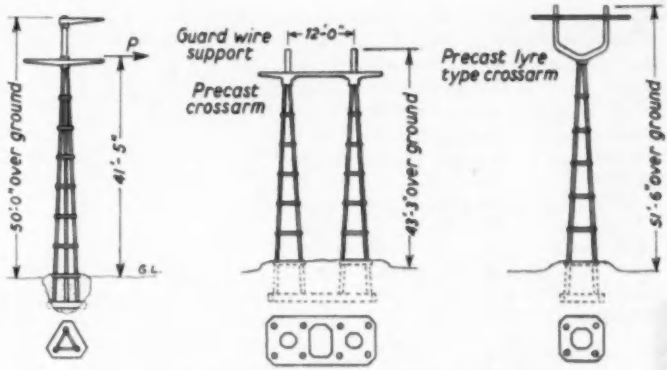


Fig. 5. Various arrangements of three- and four-legged structures with arrangement of foundation blocks

Application

Standard poles of 24, 26, 28 and 30 ft length are used in large quantities by the local G.P.O. and railways for carrier telephone routes, and by various municipalities for L.V. distribution networks. The larger poles, particularly the 42 ft size, are used by the Electricity Supply Commission for their 66 and 88 kV transmission lines. The normal method of utilising these are in "H" formation, using a reinforced concrete cross-arm.

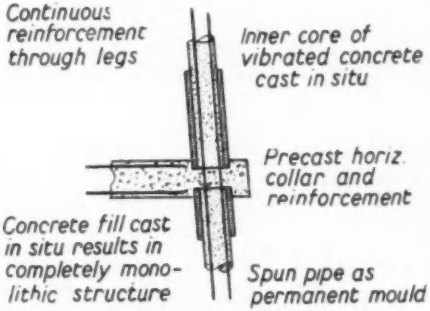

Continuous reinforcement through legs
Inner core of vibrated concrete cast in situ
Precast horiz. collar and reinforcement
Concrete fill cast in situ results in completely monolithic structure
Spun pipe as permanent mould

Fig. 6. Detail at joint of tower structure

For angle and strain towers, three- and four-legged structures are used, as shown in Fig. 5, with prefabricated horizontal elements, and spun concrete pipes between the tiers. The prefabricated elements, both horizontal and vertical are erected on site, and bonded together by *in situ* concrete cast through suitable openings in the collars (Fig. 6). This forms a monolithic structure, the strength of which may be gauged from Fig. 7, showing deflection tests on a tripod mast after 24 days, when a load of 7,000 lb applied with a lever arm of 41 ft 6 in. gave a temporary deflection of 10 in., 5 in. (4,500 lb) being achieved before the first hair cracks appeared.

The longitudinal steel reinforcement in the legs of these towers is continuous throughout, and is bonded to splice bars, which are cast into the main foundation block.

Where long spans are required on sloping ground, it is frequently convenient to use three independent supports, as shown in Fig. 8, which allows of variable spacing and tower heights, it being frequently convenient to shorten the upper towers rather than to use towers of the same length and additional excavation. By the same token the lower towers can be extended if required, the arrangement being as shown in Fig. 9. Details of the supports for conductor and guard wire on independent structures are as shown in Fig. 10.

Pre-stressed Spun Poles

It has been suggested that the ideal concrete pole would combine the advantages of pre-stressed reinforcement with those of the spun pole. While the author is agreed that this would be an ideal solution, there are certain

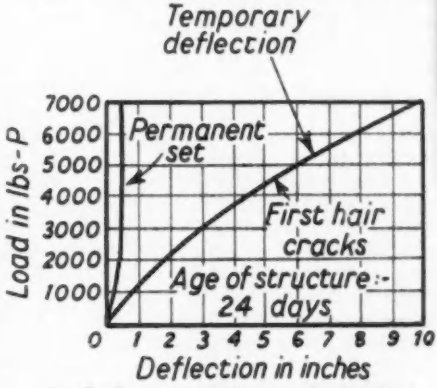


Fig. 7. Tests on tripod tower after 24 days

practical objections. While there are no real technical obstacles to the combination of the two processes, the cost would inevitably be higher. In the first place, the moulds themselves would be more expensive, since they would require to be strong enough to withstand the buckling effect of the tensile stresses in the reinforcing wires.

Secondly, in addition to the heavier intrinsic cost of moulds, there would need to be more of them for the same rate of production. At present, it is normal to remove a pole from its mould after a few hours' steam curing, thus releasing the mould for further production.

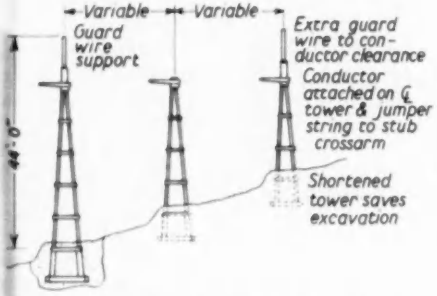


Fig. 8. Independent structures for hilly country

Fig. 9 (below). Method of extending structure

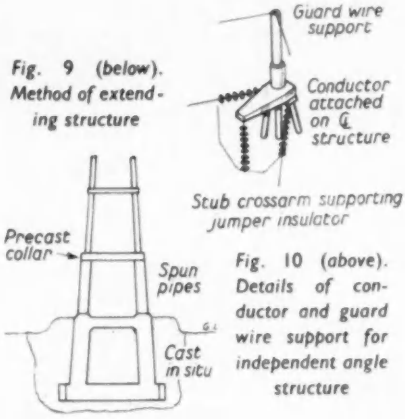


Fig. 10 (above). Details of conductor and guard wire support for independent angle structure

The delay in dismantling consequent upon waiting for the pole to mature for a longer period would not only entail a much greater number of moulds, but would increase the factory area required for a given volume of production. Nevertheless, the author believes that these objections may eventually be overcome, when the concrete pole will be capable of an even more valuable contribution to electricity transmission and distribution.

Spun Concrete Poles for 66 and 88 kV Transmission

By I. de Villiers*

The utilisation of spun concrete poles may best be illustrated by actual examples on the 88 kV transmission line from Booth, extending some 76 miles to Marburg, just outside Port Shepstone.

For normal spans and spacings, suspension towers of "H" formation are used as shown opposite. The overall length of the poles is 42 ft, and each is buried to a depth of 6 ft. Spacing between poles centres is 11 ft, and a pre-cast reinforced concrete cross arm rests on the two collars 13 in. below the top of the poles. The diameter of the poles is 8½ in. at the top, and 20 in. at the butt.

The equivalent working load at 2 ft. below the top, when the butt is rigidly clamped for 6 ft, is 960 lb. Breaking load, under the same conditions (i.e. top butt clamped for 6 ft and load applied 2 ft below top) is 3,320 lb. Normally this type of structure is used for a maximum span of 500 ft, giving normal clearance over level ground at this span.

* Chief Engineer (Electrical), Electricity Supply Commission, Johannesburg.

Angles and Long Spans

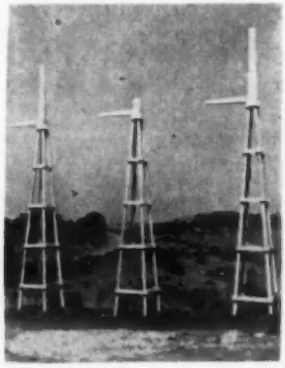
For strain or angle structures, an "H" formation using two 4-legged towers is the normal method. The height of the cross-arm above ground level is 30ft, and the horizontal spacing of the conductors (0·125 sq in. copper) is 10 ft for strains and angles capable of taking a 20 degree deviation from the straight.

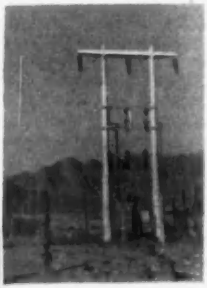
For spans over 1,000 ft up to 1,300 ft, a longer cross arm is used, giving a conductor spacing of 13 ft 3 in., which permits of deviation from the straight up to 35 degrees.

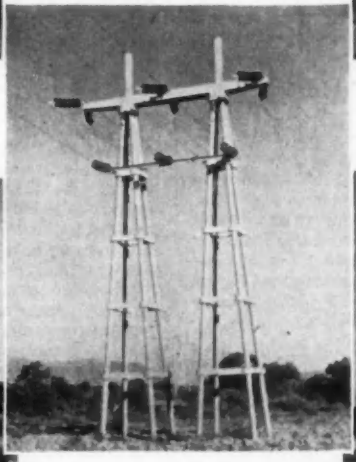
For spars from 1,300 to 1,500 ft, the conductor spacing is increased to 16 ft 6 in.; and from 1,500 to 2,000 ft it is increased to 21 ft 6 in. For these long spans, independent structures are found more suitable, the short cross-arm being used to suspend an insulator string to support the jumper. Each of the outer structures has an extension to carry the earth wire (Copperweld "Extra High Strength," 7/·114) 10 ft above the point of suspension of the main conductors.

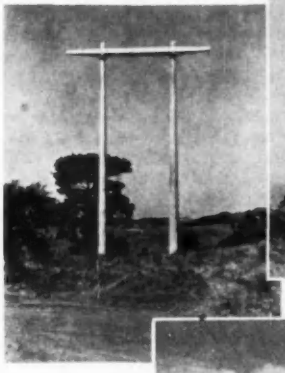
SOME TYPICAL POLE FORMATIONS

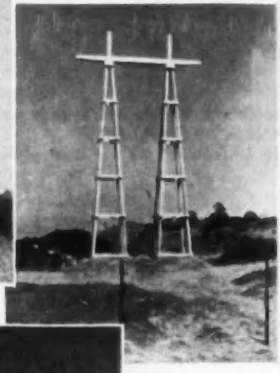
Illustrations on this page show typical pole formations for 66 and 88 kV lines during erection and in service. Bottom left-hand photo shows a single pole used for l.v. rural distribution network











Photographs from Electricity Supply Commission of South Africa and Superconcrete Ltd.

Chokeless Fluorescent Lighting

I. THE G.E.C. SYSTEM

By J. CATES*, B.Sc., F.Inst.P., and E. E. MILES*, B.Sc., A.Inst.P.

THE British 5 ft 80 W instant starting lamp and circuit is now well established, and has been very satisfactory in use. Where instant start characteristics and high overall luminous efficiency are the prime considerations, it still represents the best practice. There are, however, cases where some sacrifice in efficiency is permissible to reduce the capital cost of an installation and the problem of cheapening the gear is one which has received much attention.

The use of a resistor in place of a choke is an obvious possibility; a resistor can in general be made substantially cheaper than a choke and, moreover, since power factor correction is unnecessary, a substantial saving in initial cost can be obtained in this way. The main disadvantage of a resistive ballast is that since the resistor consumes approximately the same wattage as the fluorescent lamp, the overall efficiency of the unit is considerably reduced.

The position can be greatly improved by using a tungsten filament lamp as ballast instead of an ordinary wire-wound resistor. A filament lamp is not only a cheap and convenient form of resistor, but its light can be used to improve the overall efficiency of the system. Furthermore, the colour of the mixed light from the two types of light sources is quite pleasing and may even be preferable where the light from the fluorescent lamp alone tends to be too cold.

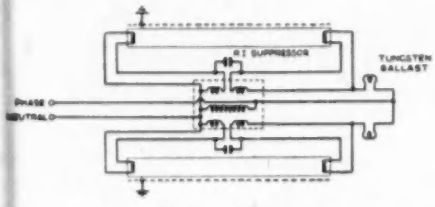


Fig. 1 Diagram of connections

Figure 1 shows a circuit diagram of the arrangement. Each fluorescent lamp is provided with a separate tungsten filament ballast, and a single cathode heating transformer is used to heat the cathodes of both lamps. For 200 V-220 V supplies, the filament heating transformer is designed to give a step-up in voltage of about 20 V to ensure starting under adverse temperature, humidity and voltage conditions. Each lamp is provided with a conducting strip along its length which, when connected to an earthed point, contributes to the same end.

The specially designed fitting in Fig. 2 is of the suspended type in which the light from the fluorescent lamps is diffused through two covers made of "Crinothene," each of which is semi-circular in cross-section. The tungsten lamps are mounted in an horizontal position in a central channel on top of the fitting, so that the light from them is indirect. The "Crinothene" covers are readily detachable to enable the fluorescent lamps to be installed or cleaned with ease.

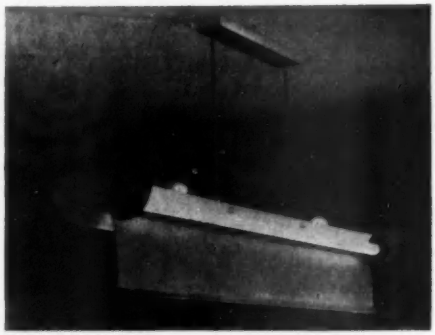


Fig. 2 G.E.C. fitting showing easy access to gear

The tungsten ballasts have been specially designed to match the characteristics of the discharge lamps, and are provided with 3-pin B.C. caps to prevent as far as possible the use of tungsten lamps of incorrect ratings.

The overall consumption of the two-lamp unit on a 230 V 50 cycle supply is 200 W, of which 120 watts is in the tungsten ballasts. Because of the non-reactive nature of the load, the power factor of the system is high (0·95) and no power factor capacitor is required. The overall efficiency is approximately 26 L/W, using the Daylight or Warm White types of discharge lamp, and a little less than this with other colours which have an intrinsically lower efficiency. The tungsten ballast provides about 30% of the total light from the unit.

Electrical Characteristics

One of the advantages of a tungsten filament ballast is that the resistance varies with the current. The wattage regulation is consequently particularly good: for example, on a 230 V nominal supply the wattage of the fluorescent lamp (which provides most of the light) alters by ± 9% for ± 10% variation in the mains voltage, while the overall wattage alters by ± 20%. For comparison, the wattage in the fluorescent lamp in a choke-operated circuit alters by ± 18% for ± 10% variation in the mains. Another advantage of the

* G.E.C. Research Laboratories, Wembley.

dependence of the tungsten ballast resistance on current is that once the fluorescent lamp is alight, it will not extinguish until the supply voltage drops to a very low value. For example, on a 200 V nominal supply, the tungsten-ballasted circuit will remain alight down to 125 V as compared with 145 V in a choke-operated circuit. The initiation of the discharge in both circuits is satisfactory down to 10% below the declared voltage.

An earthing strip is used on the lamp to overcome the inhibiting effect of humidity on the build-up of the arc. A conducting strip on the lamp itself is more effective than the use of a conductor in the proximity of the lamp. Furthermore, adequate earthing of the strip and of the fitting is essential not only to ensure starting under adverse conditions but also for safety.

The use of a double transformer results in substantial economy in the cost of the gear for two lamps. By a special arrangement of the polarity of the cathode heating windings, a further economy in the design of the transformers for the higher voltage supplies is effected. The size of the transformer is 2½ in. × 2⅛ in. × 1⅝ in. and its weight is 10 oz which makes it easily accommodated in the channel of the fitting. The wattage loss in the transformer is 4 watts.

Conclusion

It is hoped that the new tungsten-ballasted unit will find considerable application in situations where it is desired to make use of the inherent advantages of fluorescent lighting but where low initial cost is of greater importance than the highest luminous efficiency.

The unit would appear to be particularly suitable for domestic lighting where the instant starting characteristics and the possibility of further enhancing the warmth of the light by means of the tungsten ballasts are likely to be attractive features.

Although the tungsten ballast unit is at present available only for the 4 ft 40 W fluorescent lamp, it is possible that in due course the same type of unit will be introduced for other ratings.

II. THE PHILIPS SYSTEM

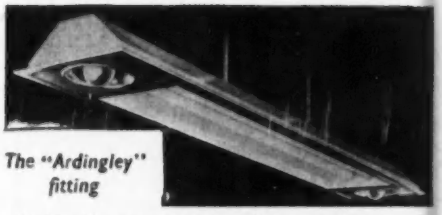
INSTANT-START fluorescent lamps using tungsten ballasts in lieu of chokes and starter switches were placed on the market this month by Philips Electrical Ltd.

The method developed by Philips is a simple series circuit, which has eliminated all auxiliary gear, the ballast lamp and the fluorescent tube being the only components required, although a small radio interference suppressor can be supplied and is recommended.

The fluorescent lamp itself is of special design, in order to obtain instant starting without preheated cathodes. The "earth strip" usually applied on the outside of instant-start lamps is *inside* the tube and instead of being earthed is connected to the cathode at one end, thus forming, in effect, an auxiliary electrode. The light output from the tungsten ballast lamp is used semi-indirectly. It is located in a silvered reflector as part of the fitting, but the bulb is internally silvered over the bottom half, so that all light comes from the reflector and not directly from the filament, thus giving diffusion without loss of light or high surface brightness. In order to prevent either the tube or the ballast being accidentally used on standard circuits, the tube has special ends and holders, and the ballast has a 3-pin bayonet cap.

The ballast lamp

Overall efficiency of both lamps is given as 22 lumens/watt at 100 hr (approximately twice that of ordinary tungsten lighting) with a power factor of 0·97 without correction. The normal consumption of a single circuit is about 113 W at 230 V. Starting—and re-starting—are instantaneous.



The "Ardingley" fitting

Fittings

For this system, Philips have developed an initial range of four new fittings, for commercial, some domestic, and industrial lighting. Each fitting accommodates two MCFB/U-40 W 4 ft tubes and two ballast lamps, therefore consuming about 226 W on 230 V a.c. and giving 4,960 initial lumens. The "Alva" is a "Crinothene"-sided plastic louvre fitting; the "Amesbury" is an all-metal semi-indirect louvre unit; the "Ardingley" is a trough fitting of conventional form; the "Arbroath" is similar to the "Ardingley" but has a slotted reflector for upward light. For the last two fittings a detachable all-metal louvre is available separately if required. Tube or chain suspensions are available for all these fittings. The special single contact lampholders for this lamp are available as separate components to lighting fitting manufacturers, or for installing these new lamps without fittings.

Price of the MCFB/U 40 W 4 ft tube in "mellow" or "natural" colour is 17s. plus 4s. 5d. P.T. The tungsten ballast lamp is 5s. plus 1s. 4d. P.T. These lamps are for use together on 220-230 V or 240-250 V a.c. mains only.

Our readers' views . . .

Inconsistency

I WAS recently called in to look over a newly wired house, refused connection by the local Electricity Board. One complaint was that two 15 amp. sockets had been wired to a 15 amp. switch-fuse which they required changing for a heavier one. While carrying this out I was very intrigued to notice the meter they had installed was only 10 amps. Can anyone please explain these seemingly conflicting ideas?

DERBYSHIRE. *"Intrigued"*

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Storage on Site

I HAVE read with interest "Megohm's" article in your issue of the 19th October regarding the difficulties of providing storage on the average site, and the necessity for arranging that materials are not sent to site until required. Surely this is a matter which can easily be solved by a little co-operation with the supplier? Reputable wholesalers maintain large stocks of materials and regard off-the-shelf deliveries as a part of their normal routine service. A little forethought on the part of the contractor in preparing his order schedule would solve this problem.

E. H. Maltby

SLOAN ELECTRICAL CO., LTD. SALES MANAGER

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Motor Rating

IT seems quite a common practice among consumers to disregard the rating period of a motor. The following is typical.

A local firm were having trouble with a heavy duty circular saw, and investigation showed the motor to be well and truly burnt out. The manager was most displeased about this as the particular machine was quite a vital part of his organisation. On questioning the machinist concerned how long the saw had been in use until its failure, the time was found to be approximately two and a half hours since lunch and most of the morning. I asked the manager if he knew the rated time the motor should be run, and of course he did not, and was most surprised when I explained the half-hour rating of the motor to him. The motor was a specially constructed built-in job for the particular machine, clearly a case of out of sight out of mind. It was rewound and is giving satisfactory service now that regard is given to the rating. I would point out that the overloads of the starter of the burnt out motor had been set to trip far too high, because of their shutting the motor down on previous occasions.

In view of the growing proportion of short-time rated motors in use today it would be a good thing if makers gave a clearer indication of the rating.

HAVANT. *S. Arnold*

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No Vacancies

MAY I, through the medium of your columns, draw attention to the effect of the present severe housing shortage on the normal beneficial redistribution of engineers and technicians engaged in industry?

At present any married engineer living in rented accommodation is for all practical purposes tied to his employment, unless similar work is available within feasible travelling distance. Anyone fortunate enough to own a house can normally take up a new position in another district without losing a great deal of money, but with the present astronomical prices of houses with vacant possession the average middle-class engineer who soldiered or sailored his youth away between 1939 and 1946 has, to use a popular but expressive phrase, "had it".

There is little evidence that industrial employers in general are alive to this problem; I have recently had to decline two positions, both offering higher status and increased salary, because of the impossibility of obtaining accommodation, and in each case the management concerned, though sympathetic, could offer no practical assistance. The regular interchange, through retirement and promotion, etc., of technical personnel between companies is as much in the interests of industry in general as in those of the technicians themselves. Until, however, management takes some positive measures (such as the acquisition of suitable property to rent to successful applicants) the numerous and oft-repeated advertisements for designers and draughtsmen in your columns (one firm appears to have been offering the same position(s) for some 18 months!) will continue to produce relatively little response.

LONDON. *"Frustrated"*

TARIFF PROPOSALS—A CHALLENGE

Consultative Council objects to Eastern Board's Plan

PROPOSALS to amend tariffs by three of the Electricity Boards make big news this week. The Boards are the South Western, London, and the Eastern. In regard to the South Western, the matter is all settled—the changes are to take effect from the first meter reading after November 19. The present unit charge of ¾d. under the two-part tariff will be increase to ⅞d., but at the same time, those consumers now paying a high running rate of more than 1¼d. p.u. will have their charges reduced to that figure. No change is being made in the fixed charge of the two-part tariffs. In addition, the flat rate for lighting is standardised at 4½d. p.u. These changes have been considered and approved by the Consultative Council.

The changes announced by the London Board include a reduction in the standard charges on the domestic and commercial two-part tariffs in certain districts, and abolition of rentals on quarterly meters installed to meet the Board's requirements in 30 districts. The flat rate for lighting is increased to 4½d. p.u. in certain districts, and there is a rise in the domestic two-part tariff standing charge in some areas. These revisions will involve a net reduction of approximately £300,000 p.a.

Eastern

The proposals of the Eastern Electricity Board, however, have met with strong opposition from the Consultative Council. At the latter's meeting last week, the report of the General Purposes Committee on the question was adopted and it was agreed to take all steps necessary to resist those of the Board's proposals which deal with increases of charges, and pursuant to Section 7 of the 1947 Act, to submit a representation to the Central Authority on the matter.

The Eastern Board's main proposals are that the flat rate for lighting should be stabilised at 6d. p.u., and the unit charge under the domestic two-part tariff be increased to ⅞d. In the many portions of the Board's area where the latter charge is already higher than ⅞d., these would remain unaltered, except that the maximum would be 1d. p.u. Also it is proposed to abolish the discounts of 2½% or 5%, and surcharges still operating in some places. The Board also originally proposed to increase the minimum fixed charge under the two-part tariff to £3, but following discussions with the Consultative Council, this was amended to 48s.

Estimated additional revenues from these proposals are £579,000 from the increased two-part unit charge, £48,000 on standard flat lighting rate, and £42,000 on abolition of discounts and surcharges. Increasing the fixed charge to £3 would have brought £350,000.

The Report of the General Purposes Committee, adopted at last week's meeting, shows that the matter has been under consideration since mid-July. The Board had explained that for the year ending March 31 next, it would be involved in additional operating costs totalling £943,000. Total loss for that year is estimated at £385,000, but, including a balance from the 1949-50 results, it was considered that the net loss for 1950-51 would not be substantially more than £300,000.

The Committee did not agree with the Board that this estimated loss was sufficiently great as to make an increase of tariffs immediately necessary. It was also considered that the financial structure of the Board ought not to be regarded as being separate from that of the B.E.A., it being suggested that a grant might be given from the Central Reserve Fund. Even if that grant is not forthcoming, it is considered better that the Board should carry forward the loss rather than impose a further increase in charges now, and to make any necessary changes when the unified tariff structure is introduced.

Other Points

Drawing attention to Section 36 (1) of the 1947 Act, in regard to balancing of the budgets of the Boards taken together, it is pointed out that the Eastern Board in the year 1948-49, faced 23% of the total national deficit, plus a percentage increase of 1% on the standard bulk supply tariff A. As two Boards paying these percentage additions made losses, whereas the Board with the greatest rebate, 10%, made, with the exception of the London Board, the largest profit, the Committee concludes that the operation of the interim bulk tariff created financial anomalies between Area Boards. It is, suggested, therefore, that the Authority should make bulk supply charges more equable.

And as a tailpiece, while complimenting the Board on its efforts in increasing the turnover on the contracting and sales of fittings, some disappointment is expressed at the smallness of the profit in relation to the turnover.

Notes on Wiring
by MEGOHM

Wiring Specifications

Some essential points often overlooked

OVER a number of years it has fallen to my lot to interpret a large variety of specifications, produced by others for electrical installation work, and also adjudicate on the merits of competitive tenders received in response to enquiries, and finally try to arrive at a fair and just value for the work eventually carried out. The experience thus gained has proved to me that though some specifications closely approach the ideal one should aim at, most of them leave much to be desired, and queries I have received from readers bear this out.

I believe that some attempts have been made to produce a "model" specification, but I am not convinced that this would solve the problem, as each engineer has his set arrangements which he wishes to incorporate, and on certain work it may be possible to try out some new development without detriment to a client.

If a job is of any magnitude, then it is surely worth while to get down to a comprehensive specification for that particular installation and not try to use a standard document, with additions and deletions, as is so often done.

Four Main Requirements

The ideal specification, to my mind, should consist of four separate parts: the preamble or general conditions; the details of work to be done; the schedule; and the tender form. This set-out avoids repetition, is convenient for reference, and is a logical sequence to follow.

As a contrast we have the specification which briefly states that the work must follow usual trade practice, comply with all relevant regulations, and be to the entire satisfaction of the engineer. Conversely, I came across one specification which reiterated in almost every clause that the contractor must supply, deliver, unload, store on site, assemble, erect, fix, adjust, connect up, test, etc., almost every item required for the installation. The terms "provide and erect complete" would have covered the requirements equally well and saved time.

The general conditions should merely cover the terms of the contract, and, from the estimator's point of view, the section dealing with the work to be done is perhaps the most important. The requirements for each item—to be read in conjunction with a complete diagram of connections, site plan, floor plans and sections, etc.—should be briefly described in plain and unambiguous language, so that any person of average intelligence who may be connected with the work can have no doubt as to what is intended. Apart from special items, for which no alternative will be accepted, maker's list no. and description with the words "or equal" should be freely given, so as to give a fair picture of the standard expected.

The schedule and tender form should be correct from the arithmetical point of view, but are unfortunately often wrong in practice, and have to be augmented by explanatory letters attached to the tender. An extra day spent in checking each item against the plans is a worthwhile task, before the documents are posted.

Attention to Detail

The contractor, unfortunately, is not always blameless, and he is apt to wait beyond the eleventh hour before quoting a price. Some even follow up their tender with amendments which arrive long after the time limit set.

It has never been satisfactorily clear to me why tenders from, say, six firms of about equal standing should vary so much as they do, though various explanations have been given. Occasionally a firm may be too low, with the object of gaining a footing with a new client, and hope to regain the forfeited profit on some future contract—or on the hoped-for extras. The outrageously high tender is probably due to the contractor having a full programme at the time and no wish to lose a good connection. In this case I consider it is better if he will frankly state the truth and express his willingness to tender for other work later on.

Another matter to which he might with advantage give better attention is in connection with samples to be submitted for approval, and here the manufacturer is frequently also involved. So often one gets an article selected at random from a batch by the storeman, without even a casual inspection to ascertain if it is up to standard or not.

MAINTENANCE METHODS—No. 3

Fight Against Moisture

Paper making demands the continuous operation of motors in wet situations

PAPER-MILL working means continuous running and ubiquitous moisture—so preventive maintenance is of first order importance for Mr. N. Beswick, the Electrical Engineer of Caldwell's Paper Mill Co., Ltd., of Inverkeithing, Scotland. Writing paper is the principal product of this installation, and the mill has five machines given over to this work.

At present private generation of the electrical power required is the order of the day but, as modernisation of the generating plant and the primary distribution system is in progress, it is not proposed to discuss this aspect of the works electrical scheme in this article. When we visited the mill we were more interested in the system of maintenance which has, since it was instituted, strikingly reduced the number of breakdowns experienced.

It is, however, relevant to note that the total generating capacity is 7·5 MW at 0·8 p.f., and that the current is distributed at 400 V a.c. for power applications, and at 230 V d.c. for lighting and portable tool circuits.

Records

There are some 550 motors in the plant, ranging from ¼ h.p. up to 450 h.p. in rating, and about half of these are slip-ring machines. Between 60 and 100 of these motors are essential to continuous working, in that their failure may result in a break in the paper. It is therefore apparent that careful records of motors and other gear are necessary to ensure that repairs can be carried out promptly when needed.

When a motor is installed it is given a number and a corresponding "motor history" card is taken out. On this is recorded the usual general details of maker's number, rating, etc., and in addition a note is made of the type number of any brushes used, and of the bearings employed. A check is then made to ensure that spares for these items are held in the Electrical Department's stores. Subsequently, full details of all uses made of the motor, of breakdowns and repairs, etc., are noted on the history card.

Similar cards are kept for capacitors, transformers, rotor starters and switchgear, reference being made on these cards to the appropriate drawings, where these are available.

A second series of cards refer to the various sections of the factory and to the principal machines. On these cards are recorded all the electrical motors, starters and other plant which is the responsibility of the electrical department, and is installed in a wo ks section or used in connection with the machine. This information can be very useful when it is uncertain just where the trouble is in a given department.

Maintenance

The "essential" motors mentioned above are inspected weekly or fortnightly, the work involving a check that the insulation is well up and that the motors are clean, that the slip-rings and brushes are in good condition, and that the latter will last without renewal until the next routine inspection. Control gear is examined at the same time as associated motors, contacts being checked and the oil changed if necessary. Special care is taken with the checking of the overload trips, because of the tendency of oil in dash pots to become sticky.

Other plant is inspected as opportunity offers, with a complete check at least once a month. Blowing out and general cleaning are performed as frequently as is possible.

Main switchgear is checked for heating once a week, while at the other end of the size scale, portable equipment comes up for a monthly test where this is at all possible. Should any portable unit show up as faulty at one of these periodical tests, it is destroyed as a safety measure. With the damp conditions that characterise paper-making, it is considered unwise to risk a repair.

Conditions for lighting equipment are specially onerous because of this moist atmosphere, and lighting fittings deteriorate somewhat rapidly. Reflectors are checked yearly, at the end of the lighting season, while lamps

over the water-containing vats and chests are inspected, and replaced if necessary, once a week.

Apart from these routine maintenance procedures, it is the strongly emphasised policy of the electrical department that all reports of trouble, however trivial they may appear, are investigated promptly and readily. In this way good co-operation is built up between the production department and the maintenance staff, and early warning is obtained of incipient faults.

When, in spite of all efforts to avoid it, the burn-out of a motor does take place, rewinding is entrusted to an outside firm. This is itself a recommendation of the maintenance system—the frequency at which rewinds occur is so low that the employment of an armature winder is uneconomic.

As is stated above, many of the motors in the mill are slip-ring machines. These are installed in preference to squirrel-cage designs because of the high torque they can deliver at starting, an important consideration when driving pumps which are dealing with thick liquids such as wood pulp. When squirrel-cage motors are used, direct starting is normally avoided. The standard limit for it is 20 h.p., though there are a few exceptional cases where it is adopted up to 50 h.p.

In the grass boiler room, where working conditions are particularly bad, totally enclosed fan-cooled motors are used. In the same way, where high pressure water jets are used to spray the grass down into the boilers, the lighting is operated at the reduced pressure of 25 volts.

Although the d.c. supply is at present used for portable tools, there is an increasing tendency to change over to compressed air operation, once again on account of the generally damp conditions prevailing.

The electrical department undertakes all necessary installation work in the factory, and in addition operates the apprentice training scheme which was described in our issue of August 10th last.

Strain Gauge Measurement

Application of Pulse Techniques

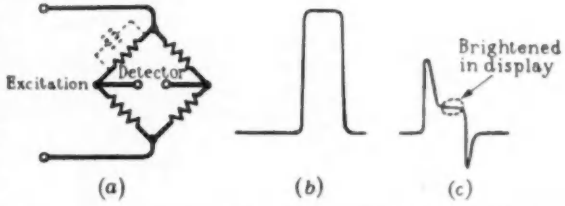
THE use of electronic methods for the measurement of small changes in physical parameters is still in a stage of rapid development, as far as display and amplification are concerned. An interesting advance in multichannel display was, however, described at the I.E.E. Measurements Section Meeting by J. G. YATES, D. H. LUCAS and D. L. JOHNSTON in their paper "Multichannel measurements of Physical Effects by Confluent-Pulse Technique with Particular Reference to the Analysis of Strain."

Normally, the small change of impedance produced by a measuring device, where a physical effect is used, is applied to one arm of a bridge, the unbalance being measured directly, as, where it is small, it can be regarded as directly proportional to the change of impedance.

In the particular system under consideration, which was designed for use with resistance strain gauges, a rectangular pulse is applied to the bridge, and the output pulse due to the unbalance, displayed on a cathode ray tube. The presence of inductance or capacity in one of the bridge arms will result in modification of the trailing and leading edges of the output pulse, but by suitable selection of pulse length and by brightening the appropriate section of the display, a plateau whose height is proportional to the unbalance can be produced. The method is not restricted to resistance measurements but can be used with changes in capacitance or inductance by using current pulses instead of voltage pulses.

After a general discussion on the subject of pulse-technique as applied to bridge measurement, the Authors described a ten-channel indicator which utilised ten separate pulse generators to excite the same number of strain-gauge bridges. The electronic arrangement ensured that the generators fired successively. Each generator consisted of a flip-flop, and the time constants were arranged so that each gauge bridge was excited every 110 microsecs, i.e. at 9·1 kc/s. Thus each bridge could be successively sampled at a high rate. By electronic switching the ten displays could be presented simultaneously on a single cathode ray tube.

The paper concluded by showing a series of typical displays as photographed, and illustrated the design and arrangement of the finalised instrument.



Effect of capacity shown in (a) on bridge. Exciting pulse (b) gives output pulse (c)

Problems and Practice

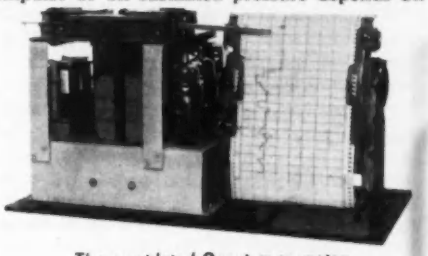
IN ENGINEERING

A Room Occupancy Meter

A MAINS-OPERATED INSTRUMENT was developed to record the numbers of persons entering or leaving a room, or other enclosure, and by inference, the number of persons within a room at any time, and the periods of occupation. The instrument was designed in connection with a proposed study of relative room usage in houses, but it may be applied to a variety of problems involving measurements of the frequency and direction of pedestrian traffic within buildings.

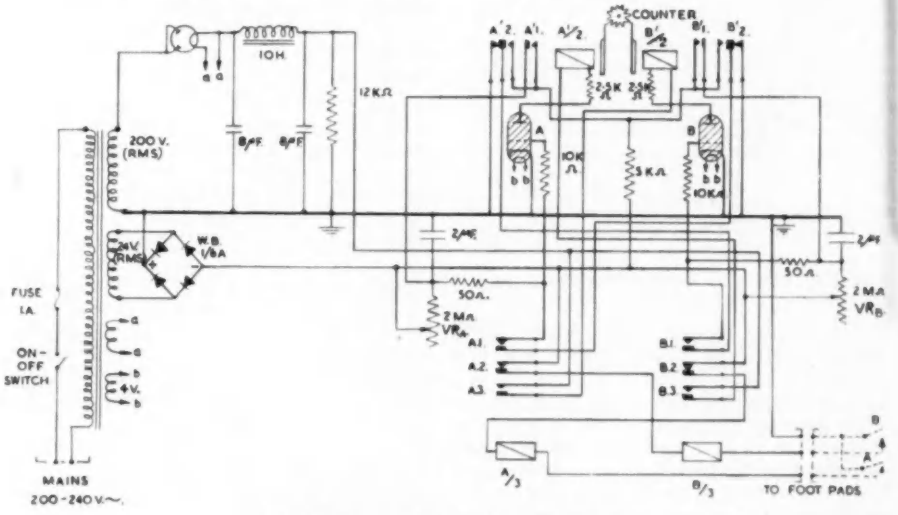
The successive closure of two contacts, connected as shown in the circuit diagram, is translated by means of the electrical relay system into a forward or reverse motion, of small interval, of a pen across a chart moving at constant speed. The direction of motion of the pen is determined by the order in sequence of closure of the contacts. The instrument remains inoperative unless both contacts are closed in sequence, and a pre-set timing device, included in the grid circuits of the gas-filled relays, ensures that if only one contact is operated the instrument returns to its normal quiescent state within a specified time.

As at present developed, the contacts are incorporated in floor pads, but photo-electric equipment may be used equally well. Whether the closure of the contacts should depend on impulse or on sustained pressure depends on the particular application, and the inclusion of the interval timer, for resetting the instrument, is of importance only when some of the traffic may not proceed to cross the boundary after having actuated one switch.



The completed Occupancy meter

The instrument was developed by the Chief Scientific Adviser's Division of the Ministry of Works (now transferred to the Department of Scientific and Industrial Research) and was manufactured by Messrs. Hendrey Relays, Ltd., of Slough, Bucks.



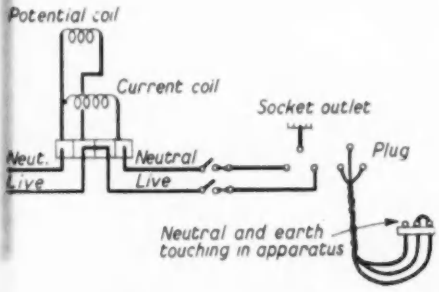
Circuit diagram of Room Occupancy meter

Meter Reversal

A REPORT was received that a meter reading taken at a consumer's premises proved to be less than the previous quarter's reading. An inspection was made at the premises. The installation was tested and found to be in order, apparatus was switched on and the meter registered, with the disc turning in the right direction. The meter had not been interfered with in any way, but it was found that the input leads were connected the wrong way round. This still did not answer the problem.

What was the answer?

It turned out that the trouble was being caused by three contributory factors. The first one was the wrong connection of the meter. The second one proved to be an inadvertent connection between the neutral and earth leads of a flexible to a piece of apparatus which is normally left plugged in, but which unfortunately was unplugged at the time of our test on the installation. The third factor was the rise and fall of voltage on the neutral terminal of the incoming main with changes of load on the distributor feeding the street. The diagram shows the circuit to make the meter go backwards at times of no load in the house in question, the speed of the meter depending on the voltage on the neutral with respect to earth.



Reversed meter connection

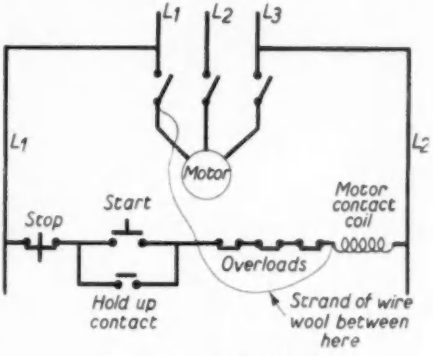
I trust that this teaser will answer some people's problems sooner than ours was answered.

The process of reversing the meter connections reversed the potential coil. However, at times of no load on the house wiring and with a voltage on the neutral terminal with respect to earth, current in the current coil flowed in a reverse direction to the potential coil. Hence the meter went backwards.—*T. Pryor*, A.M.I.E.E.

One Wire Too Many

I WAS recently called to investigate a fault on a cylindrical grinding machine.

The trouble was connected with a 1 h.p. 3-phase squirrel cage motor with the usual start and stop control circuit, and the complaint was that on pressing the stop button the operating coil failed to de-energise and the motor continued to run. The whole circuit was checked and found to be correct. It was then thought that the operating coil armature was sticking, but this proved to be in perfect order. The overloads were then opened by hand, but the coil remained energised and the



Control circuit for s.c. motor

motor continued to run. The start button was pressed and the motor started. The p.b. terminals were then loosened and each wire was removed until there were no wires connected to the push buttons at all and still it continued to run. This was, indeed, baffling!

Upon a very close examination of the starter, a minute strand of wire wool (apparently someone had recently overhauled the panel and had cleaned the contacts with wire wool) was found lodged in the tension spring of the armature. When the start button was pressed, the coil energised, the armature moved, moving the strand of wire wool with it, which contacted a moving contact braid and the coil terminal; thus shorting out completely the push buttons and overloads and making it impossible to shut down the motor. This was removed and the apparatus worked correctly.—*R. J. Parker.*

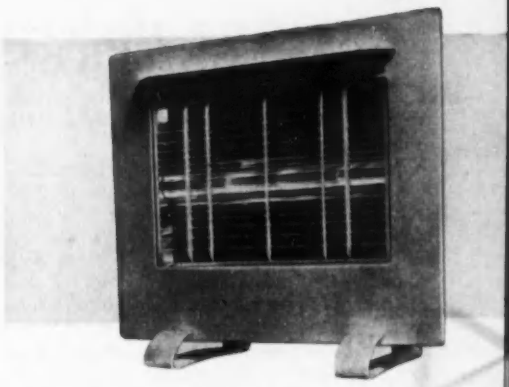
Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication.

SAFETY in Fires

THE electric fire, because of its convenience, portability and ease of connection to the mains, is subject to misuse, and not infrequently it is used under conditions where danger may arise. The number of fires and fatalities caused in this way are not inconsiderable and it is clear that manufacturers will have to give greater attention to the guarding of the element in the future.

A design of fire which is particularly noteworthy for the security of its guarding is the "Safera" which is just being placed on the market by Ferranti Ltd. In this a subsidiary reflector is placed in front of the element, thus throwing the heat into the main reflector. In this way direct radiation is prevented and there is an absence of scorching effect from the fire without appreciable loss in radiant efficiency. The heat is distributed over a wide area so that there is no danger of fire to clothes in the immediate vicinity.

The front of the reflector is provided with a wire guard in which the spacing has been varied so that it is impossible for children to touch the subsidiary reflector or to insert metal objects so as to touch the element itself. At the same time the general appearance of the guard is pleasing, as may be seen from the above illustration.

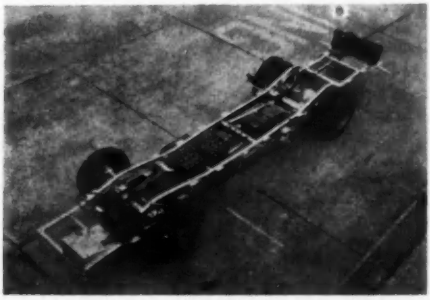


In addition to the special guarding, this fire incorporates other safety features. Should the fire be overturned or even tilted as much as 15°, a mercury switch operates to disconnect the fire. The element contact arms are protected by ceramic shields and a pilot light is provided in the front of the fire to show when it is connected to the mains. The feet of the fire, which are detachable for packing, are of a resilient design so that mechanical shock is reduced.

The Safera fire will be available in portable and panel types at £13 17s. 7d. including purchase tax. It is stove enamelled in bronze with a anodised aluminium guard and chromium reflector.

Trolleybuses for Uruguay

THE first trolleybus of eighteen ordered by the Administracion Municipal de Transportes Colectivos de Montevideo, was given a demonstration run on the L.T.E. system on Tuesday. The order was obtained by Balfour Beatty and Co. Ltd., acting on behalf of a British Trolleybus Consortium consisting of Balfour, Beatty and Co., B.T.H., E.E. Export and Trading Co., M.-V. Electrical Co., British United Traction, Sunbeam Trolleybus Co., Metropolitan-Cammell Carriage and Wagon Co., Park Royal Vehicles, and Weymann's.



View of the chassis showing the principal components

The vehicle examined was a single-deck, two-axle, 41-seater vehicle with left hand control. Overall dimensions are somewhat greater than those commonly in use in this country, the overall length being 34 ft 7 in., and the width 8 ft 0 in. Standard components are used for the electrical system to enable complete interchangeability between the member firms and to provide trouble-free maintenance. Thus the motor is a Type 210 to B.S.S. 173/41 with a one-hour rating of 125 h.p. and continuous rating of 115 h.p. Special care has been taken in the ventilation to allow the motor to be immersed in flood water up to the centre line for considerable periods.

Speaking at a luncheon given after the demonstration run, Mr. Ian C. A. Murray referred to the goodwill which had always existed between this country and Uruguay, and hoped that the initial success of the Consortium in obtaining the first order would be the forerunner of many more.

His Excellency Dr. Don Enrique E. Buero, the Uruguay Ambassador, replied by expressing his appreciation of the high level of the workmanship which had been maintained under severe competition. He thought the vehicle was an expression of friendship and cordiality between the two countries of Uruguay and Gt. Britain.

LOCAL CENTRES

Problems of Supply discussed by I.E.E. Chairmen

NOT all the local centre chairmen's addresses were reviewed in our issue of 19th October, and amongst those which have since come to hand is that of Mr. D. H. Kendon (South Midlands Centre), who dealt with "money, the most important tool of the engineer." In a provocative lecture, which considered the fundamental problems of many aspects of supply engineering, Mr. Kendon first remarked on the gradual change in the ratio of unit charge for power and for domestic supplies. This charge is matched by an extension in the hours of use in the home. It is worth noting that over a large area, in January last, the Sunday demand exceeded the corresponding weekday figure. The load goes with the people, a fact not always realised when load spreading requirements are discussed.

Since the early days, the combination of a relatively high standing charge with a low unit charge for domestic electricity has served admirably, but with a change in the ratio of fixed to running costs, and extended use of electricity, a simple flat rate for domestic supply may eventually become possible. To this end an energetic education policy is required. Load factor considerations, when diversity is taken into account, may show that the use of high-wattage appliances is preferable to that of low-wattage types connected for longer periods.

A discussion on depreciation allowances filled much of the paper. The chairman considers that, on the whole, longer life should be allowed for electrical equipment, and that replacement cost should not be a criterion. In regard to maintenance, he was "strongly in favour of making a Rolls-Royce job and screwing the bonnet down." Finally, he dealt with the trend in the cost of electricity to the consumer, and decided that probably this would rise—but not necessarily so, and certainly not in the same proportion as fuel and capital goods.

Domestic Electrification

Two chairmen's addresses were delivered in Ireland—one by Mr. R. P. Watson, of the Northern Ireland Centre, and the other by Mr. P. G. Boyd, Irish Branch. Mr. Watson delivered a brief survey of the development in domestic electrification, and after an historical review, came to the problem of inferior quality material and poor installation workmanship. He considered that the electrician should join the chemist, dentist and doctor in being controlled by statute: he could be as great a danger to the community. Compliance with the I.E.E. wiring regulations should be made obligatory.

Earthing remains an important problem, and it has been made worse by use of non-metallic waterpipes. In the consumer's installation ineffective earthing frequently results from inferior workmanship, and the importance of safety considerations still needs stressing. This granted, an electrical installation can be judged by the facilities it offers to allow the use of electricity for all reasonably foreseeable purposes.

While screwed steel conduit is probably the highest quality in wiring, t.r.s. is more popular today because of prevailing high costs. In wiring, provision for an electric clock and transportable radio in every room should not be overlooked. Close attention to kitchen layout and lighting is necessary, and here fluorescent lamps have considerable possibilities.

Supply in Ireland

Mr. Boyd's address covered the progress of the electrical supply system in Eire during the last 25 years, beginning with the Shannon Electricity Bill, passed by the Dail and Senate in May 1925, and the Electricity Supply Board set up in August 1927. Ardnacrusha hydro-electric station was commissioned in October 1929, and by 1931 supplied the major portion of the country's demand, generating 110 million kWh out of a total of 132 million. Up to the present date the only case of sustained outage has been during peak load hours during February 1933, when a snow blizzard had severely damaged a double circuit 110 kV line. In 1949-50, 782 million kWh were generated, with a peak load of 217 MW. The total plant capacity at the end of March was 243 MW, 125 MW being in thermal stations.

Mr. Boyd described the position as regards existing and planned generating stations in some detail, and then went on to deal with the main transmission system. 110 kV and 38 kV are the standard voltages used, and early this year there were 1,023 km of line working at the higher voltage, with a further 540 km in hand. Since 1938 two wooden poles with a steel cross-arm (portal type) have been used as supports, and steel-cored aluminium cable has become standard.

USE RESEARCH SPEEDILY

Quickening the Transition from Laboratory to Shop

RESEARCH is an accepted activity of the electrical plant manufacturing industry, but while the willingness to undertake investigations is recognised, there is sometimes adverse criticism of the time taken to incorporate the results in production and design. With this background, a review of the working of research departments was presented by Mr. S. E. Goodall, M.Sc. (Eng.), M.I.E.E. (W. T. Henley's), in his inaugural address as chairman of the I.E.E. Supply Section.

Mr. S. E. Goodall

The first requirement for efficient operation of a research department is a sufficient number of scientists and technologists in each of the fields of activity with which the parent organisation is concerned. The individual members of the department may be divided for administrative purposes according to their particular knowledge, or into investigating teams representing several branches of knowledge. The first of these systems is largely impracticable, and the second can prove very expensive, as each specialist in a particular team is unlikely to be employed on every problem. A complicating problem is the high cost of much necessary equipment.

A workable compromise which has led to good results is the dividing of the department into groups or branches corresponding to the main branches of activity, with a superimposed team system with team leaders.

Extra-Mural Work

Some facilities must be granted to enable suitable industrial research workers to carry out "academic"—long term—researches, which may be of no direct productive value. Once again, a compromise may provide the answer, the department being encouraged to concentrate on development work, with the more scientifically minded amongst the staff allowed to look into less immediate problems. The arrangement has the special advantage of providing a worth-while channel of liaison with the schools of research in the universities. This can be further developed by establishing a definite arrangement for mutual help with the local university and technical colleges.

Another form of outside investigation into long-term problems is that conducted by the research associations. To be effective, this needs freeing from an "over-elaborate system of criticism and control by panels, sub-committees and committees."

Programmes

Determining what work should be financed in the research laboratories is one of the most difficult problems in the electrical industry. There can be no guaranteed return for the investment, and reliance must be placed on the engineer's technical acumen. Two extreme methods of dealing with the matter present themselves—a lump sum may be voted every year for research purposes, or every research problem may be argued out with the commercial departments. For practical working some half-way stage must be found. Staff salaries largely control annual expenditure, and beyond this there should be little commercial restraint. There should, however, be machinery for obtaining board approval for major projects.

In translating the results of research into production, delays are inevitable, but they often become longer than necessary. A fundamental cause is that in most companies no one man has the full-time job of shortening this period of transition. If the research effort is to be encouraged, there must be some method of bridging the gap between laboratory and shop. One solution is to allow the research department itself to begin prototype manufacture. This usually results in the production department taking over the work as soon as a profit begins to be made. Rather similar is the setting up of a special department to deal with prototype development to the production stage. If this is adopted, then the research department and the production development department should have the same manager. A final possibility is the provision of a development section for each branch of production in the works. This way has the disadvantage, however, that there are still two different sets of people with only one available set of plant.

Neither of the first two solutions is cheap, but a rich reward may be reaped, and strong support given to the traditional leading place of the electrical concerns in British industry as a whole.

overseas news

Good News for Sweden

The Morsil power station in Jamtland, Sweden, the construction of which was begun in 1945, has now been completed at a cost of Kr. 22-23 millions. The new plant has a capacity of 20,000 kW.

With improved conditions generally in most parts of the country, the State Water Power Board estimates that only small restrictions on the use of electrical energy will be necessary during the coming winter, and practically none at all for domestic consumers.

Station Transfer

The date now fixed for the transfer of responsibility for operation of the Newport 'A' power station from the State Railway to the State Electricity Commission of Victoria is January 21 next. The State Parliament authorised the transfer in July, 1948. Mr. Hunt, chairman of the Commission, has said that 200 men employed at the station would receive pay rises averaging £1 when they were employed by the Commission. Sixty-five had refused to transfer.

Another Big Loco Order

What is claimed to be the largest order for diesel-electric traction equipment ever placed with a British firm, has just been received by the Metropolitan-Vickers Electrical Co., Ltd. It is for 48 diesel-electric main-line locomotives for the Western Australian Government. Value of the order is about £A2,250,000. The locomotives are to be of rigid frame design, of the 4-8-4 type, with four driving axles, and two 2-axle carrying and guiding bogies to meet the low axle-loading requirements. Each loco will be fitted with a Crossley 2-stroke loop-scavenge diesel engine with a service rating under Australian climatic conditions of 1,100 b.h.p. The traction motors, generators and auxiliary machinery will be made at the M.-V. Attercliffe Common Works, Sheffield, and the remaining electrical equipment at Trafford Park. It will be recalled that Met.-Vickers obtained an order for 40 electric locomotives, valued at £A2,500,000, from the New South Wales Government Railways last month.

An Acquisition Snag

The New South Wales State cabinet has decided to introduce legislation to amend the Electricity Commission Act, to provide for the compulsory acquisition of the Balmain Electric Light and Power Supply Corporation, Ltd. Under its Act, the Electricity Commission, set up last May, was given power to take over the generating stations of the Sydney County Council, the Railways Department and the Southern Electricity Supply. The station of the latter undertaking has been taken over as from November 1, 1950. The Commission was also given authority to negotiate for the acquisition of the Balmain Corporation. Negotiations between the Commission and the corporation have been taking place for more than two months. The chairman of the Balmain Corporation, Mr. R. C. Dixon, has said that under the present Act individual shareholders had the right to say whether they would sell their shares to the Government.

Tobique Project

Work is to start almost immediately on the construction of the hydro-electric development on the Tobique River, for the New Brunswick Electric Power Commission, a contract having just been awarded to the Power Corporation of Canada. Cost of the project is estimated at $5,600,000. The Tobique generating plant will involve a dam across the Tobique River at the Narrows and smaller dams at the outlets of several lakes. The project is expected to be completed and the plant in operation in 1953. It will add about 20,000 h.p. to the Power Commission's system.

The Commission also has under construction a 16,000 h.p. steam power plant at Grand Lake, which is planned to be completed by the autumn of 1951, at a cost of $4,000,000. These two development will raise the Commission's total of hydro and steam generating capacity to about 141,000 h.p.

Quebec Scheme Approved

Announcing the Quebec Government's authorisation to the Aluminium Co. of Canada to proceed with plans for another hydro-electric development, at an estimated cost of $30 million, Mr. Duplessis, Premier of Quebec, stressed that the international situation had given impetus to power projects, and an increasing demand for aluminium had developed in world markets. Pointing out that the demand for aluminium was particularly immense in the United States, he said it was strongly possible the United States might buy Quebec-manufactured aluminium products to the extent of over $75 million. To meet this demand, additional hydro-electric development was necessary, and Alcan's new development would be specially beneficial to the Province and Canada as a whole.

A New B.C. Power Site

A water power site in British Columbia, capable of producing at least 500,000 h.p., has been examined by American Army engineers who have

been exploring power possibilities in the Province. The site, which was first put forward about 2 years ago, is at a point on the Big Bend highway, 90 miles north of Revelstoke. Here the Columbia River could be stopped by a 600 ft. dam at the end of a canyon. The proposed dam would be just below Mica Creek near the town of Wardner, and would hold the Columbia River in storage for the drought seasons at Coulee dam, 300 miles south. The water would first be used by Canada and then by the United States. The site is in central British Columbia, where the provincial Government is anxious to encourage industry.

Gas Turbines for B.C.?

The end of economical hydro-electric development on the southern end of Vancouver Island, British Columbia, may be in sight, declared Mr. T. Ingledew, chief engineer of the B.C. Electric Co., last month. In future the power needs of the Greater Victoria area may be met by gas-turbine generators, for he considered it was not unreasonable to suggest that the gas turbine may provide electricity at competitive cost with hydro schemes.

Out in the Yukon

Preliminary work on the power project on the Mayo river in the Yukon will be started at a comparatively early date, it is learned. Tenders have already been called for some civil construction work. The project is expected to cost about $3,000,000 and take two years to complete. Its capacity will be 3,000 h.p. initially.

Extension Work

The Pictou Municipal Council has approved the borrowing by the Pictou County Power Board of the sum of $300,000 for extensions and improvements to its distribution and transmission system. The money would also reimburse the Board for capital expenditure already incurred.

Standardisation in Pakistan

Following earlier recommendations, it is proposed to set up a Central Standards Institute in Pakistan. The Government, in consultation with various organisations in the country and abroad, have prepared a scheme which has generally been accepted. The Standards Institute will function under the control of the Director-General of Supply and Development. The Institute will be divided into seven sections, including electrical engineering, civil and mechanical engineering.

The Mica Trade

The threat to the Indian mica trade from the introduction of integrated mica by the U.S. Navy Department was considered by the Mica Advisory Committee at its meeting last month. India, of course, has a virtual monopoly in mica, but we reported some time ago that a pilot plant for making integrated mica was nearing completion in America, after 10 years of research. The new material, it was stated, promised to make America —the world's largest importer of Indian mica— self-sufficient to a large degree in some grades of mica. The same electrical characteristics as natural mica were claimed for the new material, and it was stated that its resistance to heat was even better than that of natural mica. The Committee also decided to continue the ban on the import of mica from Brazil for the purpose of processing into splittings and re-export and have recommended to the Central Government not to allow such imports from other countries.

To Improve Industry

Following a tour of factories, arranged by the Federation of Indian Chambers of Commerce and Industry, to give a fair picture both of the country's industrial development and the impediments in the way of more effective expansion, 34 Indian M.P.s have just issued their report. In this it is suggested that imports of electric motors and fans should be restricted; that the prices of electrical sheets should be reduced, and that a reduction of duty on imported materials was essential for the fan industry. In regard to electric lamps, attention is drawn to the delay manufacturers experience in obtaining licences for the import of vital raw material. The shortage of gas, too, has disturbed that industry's production for some months. Manufacturers of cables and wires are also finding difficulty in getting all their requirements of raw materials such as the particular type of cotton yarn from indigenous sources.

Marking of Goods

Under recent Indian Merchandise Marks legislation it is laid down that on all kinds of electrical apparatus and appliances, electric lamps, dry cells, motor car batteries, and electric torches, imported into India, the country of origin shall be clearly marked on the goods themselves.

South Coast Power Line

Work on the £400,000 power scheme for the Natal South Coast is forging ahead, and already the concrete pylons which are to carry the new 88 kV power line from Durban to Marburg, near Port Shepstone, have reached Umzinto—approximately half way. The concrete pylons, each weighing about 5,000 lb., are being built for the Electricity Supply Commission of South Africa, about two miles inland from the coast beyond the heavy moist sea atmosphere which has been responsible for interruptions and breakdowns in supply along the existing power line in recent years. It is expected that the new power line will be completed in about six months time. Construction of the type of pylons being used, is described elsewhere in this issue.

Extensions

Ratepayers of Aberdeen, Cape Colony, last month agreed to a proposal that the Town Council be authorised to borrow £10,500 for an extension of its electricity scheme. Two new engines, totalling 95 kW, will be purchased and two engines will be made semi-automatic in order to eliminate the night shift at the power station. New lines will also be built to serve the outskirts of the town.

PERSONALITIES

IN THE INDUSTRY

To fill the post of assistant station superintendent at Earley generating station, the Southern Division, B.E.A., has promoted **Mr. R. G. Henbest**, A.M.I.E.E., A.M.Inst. F., who has been station superintendent at Cowes, I.O.W. for the past five years. Educated at Bridge Boys' School, Harrow, and Acton Technical College, he served an apprenticeship with the General Electric Co., before spending a period with Kodak Ltd., and the North Eastern Electric Supply Co., Ltd. Subsequently joining the Edmundsons group, he successively acted as charge engineer, maintenance engineer and station superintendent at Cambridge.

Mr. R. G. Henbest

Three appointments are announced by the Yorkshire Switchgear and Engineering Co., Ltd. **Mr. W. B. Day,** B.Sc., previously contracts manager, has been appointed sales manager; **Mr. G. E. Lowe** has been promoted to chief engineer, and **Mr. A. R. Rumfitt,** A.M.I.E.E., has returned to the company as technical manager. Mr. Day will now operate from Leeds in co-operation with Mr. Reginald Cox, the London director. Prior to joining Y.S.E. in 1945, Mr. Day was with Asea Electric Ltd., and earlier with the Brush Electrical Engineering Co. as switchgear engineer. Mr. Lowe, now chief engineer, had previously held the positions of chief draughtsman and chief designer, being with the company since 1939. Previously he was with the Magnet Engineering Co., and chief draughtsman of the Switchgear Division of the Harland Engineering Co. Mr. Rumfitt returns to the company after a period with the Yorkshire Division of the B.E.A., from which he has now resigned. Previously he was the firm's chief testing engineer, having gained earlier experience with the Yorkshire Electric Power Co.

Mr. W. B. Day

Mr. G. E. Lowe

Mr. A. R. Rumfitt

Dr. J. S. Forrest, D.Sc., F.Inst.P., M.I.E.E., director of the Research Laboratories of the British Electricity Authority, is now in America visiting research organisations and laboratories in that country and in Canada. He is expected back about the middle of this month.

The Minister of Fuel and Power has appointed **Mr. H. M. Welland,** of Plymouth, as a part-time member of the South-Western Electricity Board, in place of the late Eng. Vice-Admiral Sir John Kincome, K.C.B.

Retiring after 38 years as mechanical superintendent at Keighley electricity works, **Mr. E. Dadswell,** was last Thursday presented with a golf bag and accessories by **Mr. O. G. Cook,** district manager, on behalf of the staff and employees.

Flying out to the Middle East tomorrow, Friday, is **Mr. S. W. Demain,** who has been mechanical maintenance engineer at Earley generating station, Southern Division, B.E.A. since 1946. He is leaving this country to take up the position of station superintendent at Kuwait. Before going to Earley, Mr. Demain was at the Hartlepool works of Richardsons Westgarth and Co., subsequently joining the Cornwall Electric Power Co., as mechanical maintenance engineer at the Hayle power station.

Mr. S. W. Demain

Mr. B. H. Clark has been elected a director of Calcutta Tramways Co., Ltd., to fill the vacancy caused by the death of Sir Geoffrey Clarke.

To succeed the late Mr. F. C. Williams, G. & J. Weir Ltd. have nominated **Mr. F. T. Randell,** as manager of their Cardiff office and their representative in South Wales and the West of England. He is already well known in the district, having been Mr. William's principal assistant for some years.

Appointed to the board of directors of the Hotpoint Electric Appliance Co., Ltd., **Mr. T. Dooley,** M.B.E., has left the Metropolitan-Vickers Electrical Co. Mr. Dooley's sphere of interest will have particular reference to the direction of manufacturing activities in the Hotpoint factories. His office is now at Llandudno Junction. He joined the M.-V. Organisation in 1927 as general foreman of the Cooker and Heater Department and, in 1930, on the formation of the Steel Products Department, became assistant to Mr. T. Campbell. Six years later he was appointed to take charge of the west works extensions No. 1 and 2 and "D" Field Gun Dept., Fitzwarren Street, and Leonard Works upon M.-V. receiving large rearmament contracts. In recognition of these services he was awarded the M.B.E. in 1941. Late in 1944, he returned to the Steel Products Dept., as superintendent, and in 1947 took charge of fabrication work production at the M.-V. factory at Stockton-on-Tees, from where he has now joined the Hotpoint group of companies.

Mr. J. M. Christie has been appointed deputy manager for Scotland for Sangamo Weston Ltd. It will be recalled that the firm's new factory at Port Glasgow was opened in June last, and this appointment reflects the growing importance attached to the Scottish enterprise.

We hear that **Mr. A. F. Lockley,** M.I.E. (India), ASSOC.I.E.E., M.A.P.I.E., has been promoted to distribution engineer to the Bombay Municipality, Bombay electric supply and transport undertaking. Mr. Lockley, who was previously with the Callenders Cable and Construction Co. (Birmingham district), left England in October 1937, to take up the post of assistant engineer in charge of the Mains Department. He was promoted to mains superintendent in 1942, and, in 1945, in addition to his duties as head of the mains department, was given charge of the public lighting department. Due to his initiative, the City of Bombay was probably the first in India to install fluorescent lighting along one of its main thoroughfares.

Mr. A. F. Lockley

Works manager at the Washington Works of James MacIntyre and Co. Ltd. since 1915, **Mr. T. G. Simpson** retired at the end of last month. To mark the occasion, a presentation was made on behalf of the employees and staff.

On his retirement from the Pender Professorship of Electrical Engineering at University College, London, **Prof. R. O. Kapp,** B.SC.(ENG.), M.I.E.E., has been appointed consultant to the firm of Kennedy and Donkin. He served with that concern from February, 1913 to March, 1935.

Mr. J. D. Nicholls

Mr. C. J. Johnson

Nominated as manager of the Supplies Section of the Overseas Division of Crompton Parkinson Ltd. as from the beginning of this month, is **Mr. J. D. Nicholls,** who was previously Birmingham Branch manager of the Supplies Division. He has been with the company since 1934, apart from service with the R.A.F. Training Command from 1941 to 1945. Another staff change announced by the firm concerns **Mr. C. J. Johnson,** an assistant branch manager at Manchester, who is being transferred to London Sales control office for special duties, but is temporarily taking charge of the Birmingham Supplies Division branch.

At the end of last month, **Col. H. Carter,** C.B.E., T.D., B.SC., A.R.C.SC., M.I.E.E., retired from the position of regional director of the G.P.O. for the Welsh and Border Counties. He is succeeded in that post by **Mr. F. E. A. Manning,** M.C., T.D., B.SC.(ENG.), M.I.MECH.E., M.I.E.E., who joined the Engineering Department of the G.P.O. in 1920, and was, for a time, principal of the Telecommunications Department at Headquarters Building. More recently he has been deputy regional director of the Home Counties region of the General Post Office.

Mr. F. E. A. Manning

OBITUARY

A prominent character in the development of telephony both in this country and abroad, **Sir Frank Gill,** K.C.M.G., O.B.E., HON.M.I.E.E., M.INST.C.E., died on October 25, aged 84, whilst attending meetings of the International Consultative Committee in Telecommunications. He was director and vice-president of the International Standard Electric Corporation, and chairman of Standard Telephones & Cables Ltd., Creed & Co., the International Marine Radio Co. and other concerns. A contemporary and friend of Alexander Graham Bell and Oliver Heaviside, his early experience was gained with the National Telephone Co., which he joined in 1882. He became chief electrician of

the N.T.C. in the Liverpool district in 1890, and about that time he invented auto-signalling on junctions and a number of other devices for telephonic communication. With the N.T.C. he rose to become engineer-in-chief from 1902 until the company was incorporated in the P.O. telephone system in 1912.

In the latter year, he started to practise as a consulting engineer in partnership with W. W. Cook, continuing till 1919, when he was made European general manager of the International Western Electric Co., and of the International Standard Electric Corporation in 1925. He was elected vice-president of the latter concern in 1928. Sir Frank was also associated with the National Telephone Co. of Spain, and the Shanghai Telephone Co. A past-president of the I.E.E. and of the A.S.E.E., his presidential address to the former body in November, 1922, outlined a scheme for an international telephone network which led to the formation of the International Consultative Committee on Telecommunications.

Sir Frank Gill

A memorial service is being held today, November 2, at 12.15 p.m., in the King's Chapel of the Savoy, W.C.2.

Another veteran of the industry, **Mr. T. P Wilmshurst,** M.B.E., M.INST.C.E., M.I.E.E., died on October 27, aged 81. He will be remembered as an Electricity Commissioner during the period 1926 to 1935, but prior to that he was electrical and tramways engineer to Derby Corporation. He served Derby for nearly forty years. His association with the Supply Industry went back to 1887 when he joined the technical staff of the Taunton Electric Light Co., one of the first electric supply concerns in the country. In 1889 he became chief engineer to the Exeter Electric Light Co., and from Exeter he went to Halifax as borough electrical engineer in 1893, and in 1898 to Derby. He was a past president of the I.M.E.A.

We learn, with regret, of the death on October 23 of **Mr. H. M. Harris,** chairman of T.M.C.-Harwell (Sales) Ltd. He had been associated with the electrical industry for over 50 years, first starting an electrical wholesaling business in South Africa. Returning to this country in 1907, he formed Harwell Ltd. after the 1914-18 war, and when that business was taken over by the Telephone Manufacturing Co. in 1933 he became managing director, a position he relinquished only last December.

We regret to record the death, on October 19, of **Mr. Brian G. Donne,** joint managing director of the Automatic Coil Winder and Electrical Equipment Co. Ltd.

A director of Calcutta Tramways Co., and other concerns, **Mr. E. L. Watts** died on October 21.

THE DAIRY SHOW, 1950

OF course, electricity really comes into its own when matters such as dairy farming, dairying and ice cream production are debated because electricity is the ideal safe power, and its attendant forms of energy, light and heat.

So the vastly increased number of electrically operated or powered exhibits to be seen at this year's Dairy Show at Olympia, London, did not surprise us.

Milking plant, including milkers, butter makers, milk coolers, pasteurisers, homogenising plant and storage plant was exhibited by all the firms of long-standing in this sphere and by many of the newer firms known well by our service department and by readers of this journal.

The G.E.C. stand was typical of many showing the practical applications of electric power

Steam raisers and sterilising plant powered by electricity were well to the fore and other forms of heating, bucket heaters, storage water heaters, mash boilers and pig farrowing heaters were all shown. Motors for mills, grinders and mashers and attendant barn and workshop machinery were included in the displays, whilst in the poultry section egg washers, graders, chick hovers, brooders and incubators all owed the greater part of their success to the forethought of designers in utilising the advantages of electricity.

In the ice cream section there were machines which made the ice cream, machines which coated it with chocolate, cut it into blocks, wrapped and sorted the blocks all automatically, by courtesy of electricity.

Electric vehicles took pride of place, admirably suited as they are to the needs of the dairyman, all types were shown by all builders, from the larger trucks to the pedestrian controlled milk pram.

Ancillary and auxiliary plant, such as fans, sack and grain dryers, electric hoists were there.

And the farmer's wife was not forgotten. Domestic labour-saving equipment for cooking and cleaning was well in evidence.

The BUYER'S *Column*

Another Creda Classic

MODERN, clean lines are the salient features of the new "Creda" immersion element type kettles which have just been introduced by the SIMPLEX ELECTRIC CO. LTD., of Oldbury, Birmingham.

The Creda kettle

Behind the design of these new kettles is the well-sounded experience of Simplex's design staff who know their business when it comes to designing electrical appliances for the household.

Of heavy gauge copper, finished in polished chromium plate with an electro tinned interior, the kettle has a capacity of 3½ pts, and due to the ingenious steam vents under the knob of the lid which direct the steam forward and away from the hand, will boil without splashing or overflowing.

The spout gives a clean smooth pouring action, does not drip, so that with the additional feature of bakelite feet, the kettle will not damage polished surfaces.

The electrical side of this appliance has been included as an integral part of the design, not as an afterthought; a "Creda" tubular sheathed element rated at 1½ kW, is fitted, the terminal ends are firmly sealed against moisture. Coupled to this is a manual reset automatic safety cutout switch. The connector fits almost flush in the neatly designed socket in the handle assembly, which complies with BSS 562. The kettle, which complies as a whole with BSS 1671/1950, is truly a winner at 70s.

The New Oldham "Major" Battery

AN improved pattern dry charged starter battery for cars was one of the new features shown by OLDHAM AND SONS LTD., Denton, Manchester, at this year's Motor Show. It is called the "Major" and in construction a new assembly technique was employed which, it is claimed, will provide the first practicable dry charged battery to be placed on the market.

The new patent "Fibrak" separator is used in conjunction with fibre glass retainer mats to armour the positive plates; by this means a dry assembly is provided, permitting the battery to be dry charged. Danger of loss of the dry charge due to moisture within the cell is completely eliminated and the battery can be stored dry charged for an indefinite period without fear of deterioration, requiring only a four-hour conditioning charge before being put into service. It is available in 6 V and 12 V patterns.

The "Major" will be supplied with a two-year guarantee against failures arising from defects of material or manufacture, for replacement or repair free of cost, should capacity fall below 80% of that shown in the makers' printed lists.

Engineers in Perspex

MANY buyers will remember the range of "Perspex" cylinders and tubes which were fabricated by Evolite Plastics, Ltd. This organisation was taken over some time ago by RICHARD DALEMAN, LTD., 325-327 Latimer Road, London, W.10, who have continued and enlarged the range of work.

One particular use of these tubes which are formed from flat sheet "Perspex" with one welded seam is in the construction of flameproof lighting equipment for coal mines. Other applications are numerous, due perhaps to the good electrical properties of "Perspex."

Richard Daleman, Ltd., also specialise in the machining of bushes for insulation and of large pieces of apparatus from solid "Perspex" block which the firm is able to laminate to many thicknesses. Solid rod up to 4 ins. or even more in diameter is machined from this block.

Standard tubing is supplied in a range of sizes from ⅜ in. to 4 in. overall diameter in various wall thicknesses but larger diameters up to 3 ft and other fabrications are made to order; so if you have a problem in "Perspex" this firm should be able to help.

Powerful, Portable, Speech

THE use of amplifiers for voice, music and gramophone is not so widespread as it could be, due in some measure no doubt to the bulk, weight and complexity of much equipment. It is, therefore gratifying to find that one manufacturer has produced a complete equipment, including microphone, all contained in one cabinet (8½ in. × 6 in. × 8 in.) and weighing 6 lb, and operating in any voltage (AC or DC) between 200 and 250 V at the low price of £12 12s. 0d. retail. Now even the smallest hotel, sales conference or lecture can have modern sound amplification at a price that will not strain the pocket. The manufacturers of this equipment, known as the Shaftesbury "Speechmaster," are the DULCI CO. LTD., of 97 Villiers Road, N.W.10.

The Speechmaster

Cigarettes with Safety

A CIGARETTE during a long drive is almost a necessity to some of us motorists but how awkward it is to keep an eye on the road, one hand on the wheel, whilst the other gropes blindly for those "damned elusive" matches.

A light with ease, permitting a cigarette with safety, will be the reward of any driver intelligent enough to fit a "Falcon" Automatic Car Lighter to his dashboard.

The lighter, small in size, secures easily and unobtrusively to the underside of the dashboard, and is operated from your battery, either 6 V or 12 V. By withdrawing the small knob the glass fibre wick is automatically ignited.

Filling the lighter with fuel is a simple matter, one filling lasts for months. Moulded in easy clean, non-inflammable "Beetle" plastic, by the HILLIER ENGINEERING CO., LTD., Oldham Road, Rochdale, Lancs., the unit is priced £2 2s. and P.T. £1 1s., and is a must for one who enjoys his motoring.

Tighter Yet

AN interesting cable tightening tool is now available in this country. It is the "Linst" tool, which is handled in Great Britain and Ireland by ASEA ELECTRIC LTD., Fulbourne Road, Walthamstow, E.17, who are sole agents here.

Our photograph shows clearly the Linst tool in operation. We should add that the tool is intended for a maximum pull of 2,200 lb and is made in three sizes: Size 3 (standard) is for cable diameter $\frac{1}{4}$ in. to 23/64 in., Size 6 for cables 15/64 in. to 15/32 in. in diameter, and the largest size, No. 8, for cables 5/16 in. to 35/64 in. Weight of the tool is 7 lb. It measures 24$\frac{1}{2}$ in. by 6$\frac{3}{4}$ in. by 1$\frac{1}{4}$ in. and is available at £15 (carriage paid) for the small size and at £16 for the larger sizes.

Main features to be noted are the parallel grip jaws which cannot damage the line; overfall, which prevents the line riding over from its alignment, and the fact that the hand lever lifts with movement in one direction only, enabling greater loads to be handled and reducing the risk of accidents.

The Linst tool makes light work of cable tightening

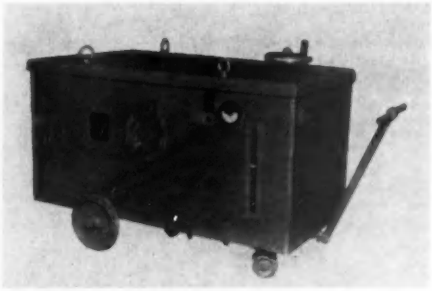
Bylock Price Changes

AS from November 1 prices of certain appliances manufactured by BYLOCK ELECTRIC, LTD., South Street, Ponders End, Middlesex, will be changed as follows:

The "Zephyr" hair dryer is increased in price to 59s. 6d., the "Simoon Queen" hair dryer which is decreased to 76s. 6d., whilst the A.M. Blower is increased to 77s. 6d. Once again increases are attributed to rising values in the material markets.

Stud Welding Power Supplies

WITH several advantages over the motor generator sets which usually supply d.c. for stud welding, the new selenium metal rectifier unit now marketed by CROMPTON PARKINSON, LTD., Crompton House, Aldwych, W.C.2, represents a considerable saving in cost—it is less than half the price of a comparable motor generator set.

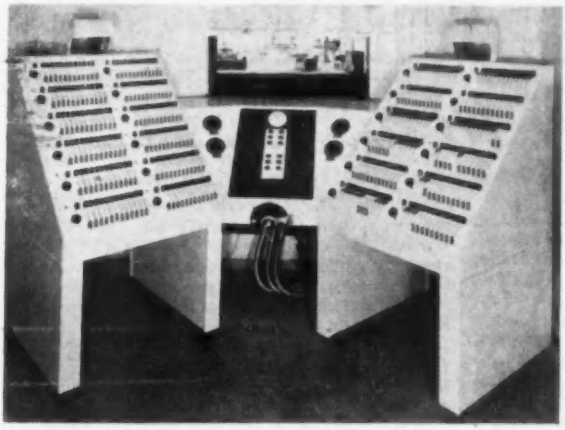


The C.P. selenium welding rectifier

Two models are available: Model "U 1" has a maximum current output of 2,000 amps and is suitable for use when welding studs up to and including $\frac{3}{4}$ in. diameter. Price is £400. The "U 2" model is smaller and gives a maximum of 1,250 amps welding current. It will deal effectively with studs up to $\frac{1}{2}$ in. diameter. Price is £245.

It comprises a low impedance 3-ph transformer feeding a full wave selenium rectifier. Power output is controlled by a 3 ph resistance in series with the transformer primary, giving continuous control of output power for the stud welding range.

Open circuit voltage is 95 V. Power factor is high at 0.9 for all loads. Maintenance is at the minimum, there being no moving parts and robust condition makes the unit suitable for heavy duty. Standard units are for 340-440 V 3 ph on any frequency between 40/100 cycles.



Lighting the Stage

Electronic equipment revolutionises control techniques

Left is seen the Strand Electric duplicate control desk fitted at the New Theatre, London

STAGE lighting presents difficult and sometimes complex control problems. Even in what appears to be a straightforward interior scene, many complex lighting changes, frequently unnoticed by the audience, are often required. Further, space considerations usually limit the number of circuits which can be controlled by conventional equipment, and losses, particularly in resistance dimmers, can be high.

For these reasons, the electronic type remote control lighting system designed by Strand Electric and Engineering Co., King St., Covent Garden, London, is of particular interest. The underlying principle is fairly simple. A voltage, tapped off from a wirewound potentiometer, is applied to the grids of three thyratrons connected in the three phases of the mains supply. Thus the d.c. output from the thyratrons may be completely controlled. This output is used to light the appropriate lamps on the stage.

Inherently this system possesses considerable advantages. First, the actual dimmer, consisting of a wirewound potentiometer and a switch, can be made extremely small; second, the valve bank can be sited remotely from the control board thus allowing the electrician to be placed in a comparatively small space whence he can see the stage; third, the dimming properties of the control are independent of the load; fourth, the a.c. load is always balanced between the three phases; and finally, electrical interlocking between circuits is simple so that proportional dimming may be obtained for numerous circuits irrespective of their initial dimming settings.

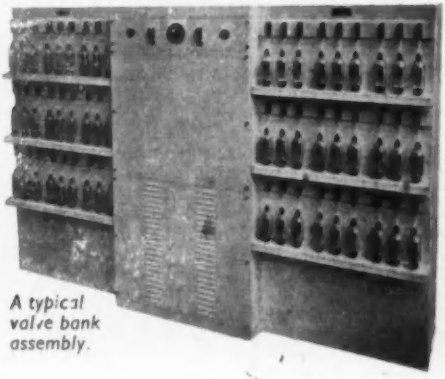
Actual Installation

Although the operating principle is straightforward, the actual design and arrangement of the control board is slightly more complex. As can be seen from the illustration (which is of the installation in the New Theatre, St. Martin's Lane) there are two complete duplicate control desks, each desk comprising 144 control units in 12 banks of 12. Each set of 12 can be dimmed simultaneously by a master dimmer located on the left hand side of the bank. Should, however, a selection of the 12 need to be dimmed only, isolating switches, located immediately above each individual dimmer, can cut it out of the overall control.

The use of duplicate boards enables the operator to set up a lighting combination for a following scene and then transfer control from one board to another by means of a handle in the centre panel.

In the New Theatre installation, the valve bank is located on a platform 40 ft above the stage. The bank itself is 27 ft long, 6 ft high and 2 ft wide. Connection to the control board is by multicore cables, the requirement only being for one wire for each dimmer way plus three feed wires. Thus we have 147 wires for a 144-way board. Due to the low current consumption, the wires themselves can be small, 7/·0076 p.v.c. being suitable. As a valve life of over 5,000 hr can be anticipated, three years' working is assured once the initial replacements have been overcome. Special terms have been arranged for these early replacements.

The attractiveness of this form of control can be gauged by the fact that by May, 1951, some eight installations will have been completed in this country, including the Old Vic, and the Shakespeare Memorial Theatre.



A typical valve bank assembly.

THE WEEK

INDUSTRY *in news* COMMERCE

Lighting Concessions Refused

THE Minister of Fuel and Power last week refused a request by the National Chamber of Trade asking that controls on shop window lighting should be lifted during Christmas week. The general secretary of the Chamber asked why shopkeepers should be the only people who were not allowed to light their lamps when they liked. The complaint arose from the Ministry's order, published early last month (see our October 5 issue), which bans the lighting of shop windows between 7 a.m. and 6 p.m. until the end of January.

In his reply, Mr. Noel-Baker said there would be danger of inconvenience and dislocation caused by power cuts during Christmas week, which was likely to be cold and also included the shortest day of the year. The electricity load was expected to be high, and in all probability a proportion of it would have to be shed at peak hours throughout the week.

As a result of the Minister's refusal, the order made at the beginning of October still holds, and retailers will not be allowed unrestricted lighting in their shops except on Christmas Day and Boxing Day.

The B.E.A.'s Collier Fleet

PLACING himself in the category of a shipowner, Lord Citrine, P.C., K.B.E., COMP.I.E.E., addressed an appreciative audience at the luncheon of the Batti-Wallahs last week on some of the operations of British Electricity Authority. He pointed out that the Authority now had 37 ships, with a further ten on order by 1952, when the fleet's tonnage would be about 123,000 tons.

After emphasising that it was the Authority's policy to maintain a healthy measure of chartering of coastwise shipping, apart from its own fleet, he spoke of the tremendous improvements which had been made aboard the ships in recent years. Conditions in the B.E.A.'s latest colliers were abreast of anything being done in this country, he claimed. Turning to nationalisation of the supply industry, he referred to the three main problems involved: organisation, financial and personnel. The financial problem was not inconsiderable, for the Act limited the Authority's borrowing powers to £700 millions, yet £250 millions had already been called upon, and it was evident that the present statutory limitation would be exceeded, he said.

The growth of load, too, had been even harassing, and means must be found for improving the load factor. They were now supplying 27% more electricity than before vesting day, about one million consumers having been added. After referring to the new generating plant programme, and the delays due to negotiations, he said he could not challenge the right of the Government to have the final word, but he felt bitter about any suggestion for cutting down development plans. He intimated that the Authority's balance sheet for 1949-50 was materially better than that for 1948-49.

It was later announced by Mr. P. V. Hunter that the Ladies' Night dinner-dance would be on March 12 at the Cafe Royal. The chief guest at the next luncheon is to be Sir Hartley Shawcross.

French Power Supply

LECTURES on the development of power supply in France since the end of the war will be given during November at the Universities of London, Aberdeen and Glasgow by M. Raymond Giguet, Director of Equipment at Electricité de France. The talks will be illustrated by films of some of the new French power stations and will be open to the public, who need not take steps to brush up their French, as M. Giguet will speak in English. The lectures in London next Tuesday at the City and Guilds College (5 p.m.), and Aberdeen, on November 9, at Marischal College (7.30 p.m.), will deal with the programme of electric power supply in France, with comments on the different types of power stations being built to cope with variations in production and consumption. M. Giguet will be in Glasgow on the following Monday (November 13), when he will give a survey of the investment programme in France. He will describe in detail the thermal programme in its relation to coal mines, steel works and Electricité de France, and the hydro-electric scheme in the Alps, Pyrenees and the Massif Central mountain ranges.

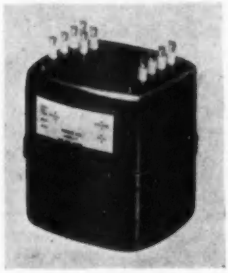
The First Half-Century

Messrs. Geipel and Lange inform us that they have been appointed sole agents for the United Kingdom for the "Ward-Leonard" system of operating electric motors for the driving of printing machinery of all kinds. Messrs. Geipel and Lange are applying a 50 Horse Power motor constructed on this system to a printing machine in one of the largest newspaper offices in London.—(*From our issue of 1st November, 1900.*)

Admiralty Transformers Available

A RANGE of 32 Admiralty power transformers between 5 VA and 2 kVA is now available for commercial use, and in addition audio-frequency transformers and power chokes can be obtained which will suit most normal requirements of manufacturers of radio equipment. The hermetically-sealed transformers and chokes are the first type to qualify as fully Inter-Service Type-Approved Standards.

The design consists of "C" core assemblies accommodated in deep-drawn steel cases and are smaller by about one-third, giving up to 50% reduction in external magnetic field compared with similar types using orthodox laminations. The shape of each has been designed to provide maximum strength, and as can be seen from the illustration, gives a good streamlined appearance. They will withstand severe conditions of vibration and shock, and also climatic extremes. Thirty-one of these sizes have tapped fixing holes at each end and thus facilitate upright or inverted mounting. Where firms do not want to tool the range for themselves, they can obtain supplies of cases and internal fittings through commercial sources. More than a dozen firms have already taken advantage of this arrangement, and as their production increases so a larger flow of these standardised transformers will reach home and export markets.



The Admiralty design

B.I.M. Autumn Conference

CHANGES have been made in procedure for the autumn conference of the British Institute of Management, to be held at Harrogate from November 16 to 19. The sectional meetings have been divided into two, and there will now be panel debates, in which a number of speakers will express their views on a variety of subjects from the platform, and discussion sessions for those wishing to pursue particular matters in greater detail. In addition, the number of sectional meetings has been increased to provide more variety and reduce the attendance at each. The usual style informal discussion groups will again include sectional meeting subjects and, as at the spring conference, numbers will be limited to between 10 and 15 persons. "Managers of the Future" will be the title of the first address, on Thursday evening, given by the Rt. Hon. R. A. Butler, and Sir Robert Sinclair will open Friday's programme with a talk on "Industry and Management." Highlights of the conference will be summarised on the final morning by Mr. L. O. Russell.

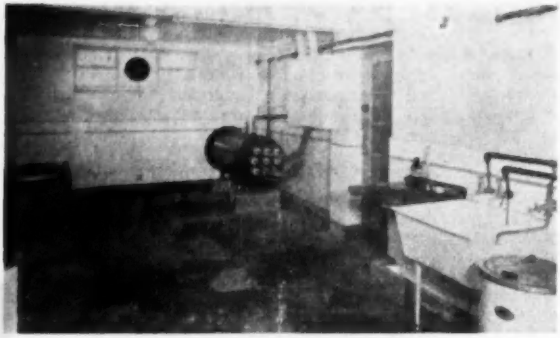
Govt. Grants for Hotel Equipment

FOLLOWING Mr. Harold Wilson, President of the Board of Trade's remark early last month that few hoteliers had applied for the Government grants to improve their establishments, E.D.A. and some Electricity Boards are circulating 100,000 leaflets explaining the Government's scheme. The leaflet gives details of the steps the B.o.T. have taken to help hoteliers install new equipment or even renew old appliances. Reason for the grants is part of the general plan to attract more visitors from the U.S. and Canada. The leaflet also draws attention to a number of electrical appliances which are subjected to purchase tax, and points out that under the scheme, appliances can be installed free of the tax. Copies can be obtained from Electricity Service Centres, or from E.D.A. at 2 Savoy Hill, W.C.2.

Thorn acquire Geo. Forrest Ltd.

THE firm of George Forrest and Son Ltd., whose heavy losses sustained during the bombing of London in the war were one reason why the business went into voluntary liquidation last July, has been taken over by Thorn Electrical Industries Ltd. Established over 50 years ago, the business will continue as a self-contained organisation but will have the resources of Thorn Electrical at its disposal to keep up its service to customers. We understand that the internal reorganisation of the old company is now in hand and that Mr. L. Davis has taken over the design department. Enquiries should, for the time being, be sent to Mr. H. H. Ballin, manager of Thorn's Lighting Division, at 30 Osborne Road, W.3.

Man's best friend looks disapprovingly at a new 30 cwt dairy truck now undergoing tests with the Jersey Farm Dairies in Canada. The truck was exported to Canada by Smith's Electric Vehicles Ltd.



Washing room of an all-electric laundry provided by Leeds Corporation at a new block of flats at Holbeck. It contains eight 3 kW wash-boilers, two centrifugal dryers with 3 h.p. motors, and a cylinder with nine 9 kW immersion heaters. In a drying room nearby are eight drying horses, hot air being driven by a 2 h.p. motor and fan through a heating unit housing 14.25 kW elements. Both rooms are ventilated by 12 in. Vent Axia fans. Installation was by Yorkshire Electricity Board

Radio and T.V. Sales Improve

SALES of both radio and television sets continued to improve during August according to the latest R.T.R.A. sales index published this week. The public's indifference to indoor entertainment during the summer was felt most in June, but although figures have now risen above those of July for both television and radio receivers, sales of the latter are slightly down when compared with the corresponding months in 1949. The average number of sets sold per shop is as follows:—

Month	1952	1949
RADIO		
July	9.07	9.48
August	10.31	11.71
TELEVISION		
July	4.51	4.63
August	6.77	6.17

"A Red-Letter Day"

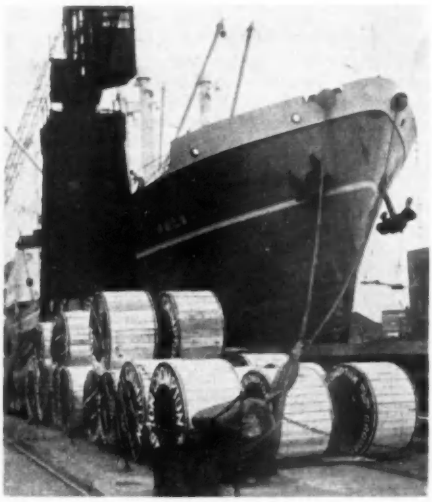
SPEAKING at the annual dinner of the Southern Section of E.C.A., the president, Mr. P. G. Wallis, remarked that vesting day was a red-letter day for electrical contractors. He said this did not mean it was an occasion for great joy, but that it gave contractors an opportunity of showing what private enterprise could do. The Association was proud of the standard of work carried out by its members, said the president, but asked what would happen if an Area Board carried out bad work when the proposed National Inspection Council had been inaugurated. In conclusion Mr. Wallis suggested it would be a good thing if the 1937 Supply Regulations were amended so that the supply authority would be compelled to refuse the connection of an unsafe installation rather than be "allowed" to refuse.

Statistics to help Retailers

THE trade statistics which appear in the B.o.T. journal showing seasonal fluctuations, variations in different parts of the country and changes in expenditure on goods in the various trades covered are to be extended to include many more retailers. Up to 1946 these statistics were almost exclusively obtained from large-scale retailers, and it was decided to cover returns from medium-sized independent shopkeepers in ten trades, electrical and radio shops being included in that number.

Since publication of the statistics began some three years ago, the number of shopkeepers making these voluntary monthly returns has fallen, and the B.o.T. proposes to recruit additional contributions so that the figures will be more reliable and give more information. Shopkeepers may therefore expect a call from a representative of the Board shortly, and an invitation to send in brief figures showing his total sales each month.

The first reaction to the extension of this scheme may be that it is an example of a Government



A £36,000 order comprising 64 miles of paper insulated high voltage cable, manufactured at Derby works of Crompton Parkinson Ltd., awaiting shipment to Yugoslavia. This was the second large order despatched by the company to Yugoslavia this year — the first valued at £35,000 was for 63 miles of cable

department's "snooping" into retailers' affairs, but although the Government will gain useful information from the collection of statistics, the traders themselves will find the figures most beneficial. For instance, he can compare his own progress with that of other traders, and judge the likely size of seasonal demand apart from knowledge based on his own experience. Manufacturers can be guided in the organisation of the flow of goods, and trade associations might obtain much factual information to help in matters concerning the trade as a whole.

S.W. Board holds Sales Talks

RESULTS of this year's sales campaign and a preview of plans for the Christmas sales drive were outlined at four conferences held recently at Torquay and Taunton for the commercial staff of the S.W. Electricity Board. The theme of the Christmas campaign will be that electric gifts make life easier, and the local staff was shown specially designed material produced for displays to link up with local advertisements and demonstrations.

Also among recent activities of S.W.B., was a three-day agricultural course, when 50 representatives heard lectures on sales methods and the applications of electricity to farming.

New Cookers for Old

A SUGGESTION that for a few coppers a day on the hire purchase system housewives could exchange their old stoves for modern electric cookers, was made by the North-Western Electricity Board at the Better Housekeeping Exhibition held in Manchester last week. Figures of cartooned policemen on one of the Board's two stands, aptly illustrated the theme, drawing attention to the "few coppers a day" needed for a new cooker. These were on the main stand devoted to cooking and water heating, while on a second visitors were able to see displays of various other domestic appliances and enjoy continuous films of electrical domestic subjects.

A view of Market Street, Chorley, where fluorescent lamps have replaced the old gas lamps following the inauguration of the town's new 3-mile lighting scheme

3-Mile Lighting Scheme at Chorley

A NEW street lighting scheme which cost over £8,800 and covers some three miles of the London to Carlisle Road at Chorley (Lancs) was recently inaugurated by the Mayor of the town, Alderman W. B. Fletcher. Thirty-two fluorescent lamps have been installed along nearly three-quarters of a mile in the town centre, and the remainder of the road is lit by sodium lamps. Each is fitted with totally enclosed refractor type lanterns of non-ferrous metal, and stainless steel fittings were specified for exposed positions. The lamps were manufactured and erected by the G.E.C., and are remotely controlled by the "Rythmatic" system of the Automatic Telephone and Electric Co. This system is the sixth to be installed in the sub-area of the N.W. Electricity Board, the others being at Bolton, Bury, Newton-le-Willows, Radcliffe and Wigan.

NEWS IN BRIEF

Tickets have been sold out for the film show, which will be introduced by the Rt. Hon. Earl of Verulam at a meeting of the Electrical Power Engineers' Association next Monday. Venue will be the Town Hall Theatre, Islington, and the time 7.15 p.m.

Swan Hunter and Wigham Richardson Ltd. are to build a 2,500-ton cable-laying ship for Cable and Wireless Ltd. It will be the 22nd cable ship built by the company, will carry 300 miles of cable and have an operational range of 10,000 miles.

Bakelite Ltd's private exhibition which shows application for plastics in the building, printing, electrical engineering, packaging and transport industries will arrive in Liverpool at the end of November. It has already visited Oslo, Stockholm, Brussels and London. The exhibition will be at 24 North John Street, from 2 p.m. on Nov. 28 to Dec. 1.

A policy of "see-for-yourself" has been adopted by the Eastern Electricity Board to deal with enquiries from farmers for electrical agricultural equipment. Many enquiries related to grain-drying and storage plant, and a party of 25 farmers recently toured four farms where those plants were in operation.

Two 1,000 kW, 360 V generators manufactured by Metro-Vick are now on their way to Australia; they incorporate the largest flywheel so far manufactured at the company's Trafford Park works. It is 11 ft 3 in. in diameter and weighs 58 tons.

Questions in Parliament

Appointments to Nationalised Industries

The Prime Minister was asked by Mr. Boyd-Carpenter, the rule governing the acceptance or retention of directorships by chairmen or other full-time members of the boards of nationalised industries. Mr. Attlee replied that the practice was to require a fulltime member of the board to resign, or refrain from accepting, any directorship the retention of which was likely, in the opinion of the Minister concerned, to affect prejudicially the discharge by him of his functions.

Subsequently, in replying to a question by Mr. Bossom, the Prime Minister stated that 44 trade union or former trade union officials had been appointed to the Boards of socialised industries, including the executives and the area boards.

Zinc Supplies

When Mr. J. Grimston asked the Minister of Supply if, in view of the decision to reduce supplies of zinc to British consumers to approximately 75% of their 1950 consumption, he would return the buying of that metal to private industry, Mr. Strauss answered that owing to the limited amount of zinc available in world markets at present, central purchase by his Department ensured a fair distribution, without prices being increased as the result of competitive buying by private consumers.

Technological Training

The Report of the National Advisory Council on Education for Industry and Commerce on Technological Training would shortly be published, Mr. Tomlinson stated, in reply to a question by Mr. Watkinson. He proposed to allow time for comments before deciding what action to take on its recommendations, he said.

Live Rail Accidents

How many children had been electrocuted in the last year on live rails, other than those of London Transport and what steps were being taken to prevent children gaining access to those lines, asked Col. Clarke. Replying Mr. Barnes said 16 were killed and 10 injured during 1949. The 1949 report of the chief inspector of railways, soon to be published, refers to proposed measures to be taken.

Press and Consultative Councils

Replying to Mr. Albu on the question of readmission of the Press to meetings of each local committee of the Electricity Consultative Councils, Mr. Noel-Baker pointed out that those councils had power to regulate their own procedure, but were requested to present, for the approval of the Minister, schemes for the organisation and procedure of their district committees. The councils decided to admit the Press and the public to their own meetings, but not to district meetings. The chairmen of the councils had twice discussed the matter recently, and unanimously agreed that, for the present, that rule should be maintained.

Technical State Scholarships

Dr. King asked the Minister of Education whether he would institute a number of State scholarships similar to those for students over 25 years of age, to be awarded to younger men and women who had secured intermediate art, science or engineering degree by part-time study, and sought full-time university education to read for an honours course. Mr. Tomlinson replied that the Technical State Scholarships, numbering 120 a year, were offered to students, including those referred to, who had been in attendance at establishments of further education.

Inquiry into Socialised Industries

Opening the debate on socialised industries on Wednesday of last week, Mr. Morrison moved: "That this House notes the steps which have been taken to give effect to the responsibility to the community (including consumers and workpeople) of the socialised industries, and will welcome any further measures to increase their public accountability, consistently with the duty of the Boards to manage the industries with maximum efficiency in the public interest."

He announced that the Government was prepared, with the full approval of the chairmen of the national boards, to institute periodical inquiries into the management of the nationalised industries after the manner of the B.B.C. inquiry. The B.B.C. inquiry falls every five years, but Mr. Morrison thought the inquiry into the nationalised industries might take place at intervals of seven years. The aim of the inquiry would be to pronounce on questions of broad policy and on the structure of the organisations, and not on technical matters. This would provide an element of accountability to the public without interfering with the efficiency of the boards. Earlier, Mr. Morrison opposed the idea of a Select Committee, as some suggested, on the ground that it would interfere with the efficiency of the boards. He felt that repeated appearance before a Select Committee would make members of the boards apprehensive and produce that overcautious mood which was found in the Civil Service and which was very proper in that sphere, but which constituted the strongest argument for not nationalising industries through Departments of State.

During the course of the subsequently lengthy debate many points were put forward. Mr. Butler considered that the extraneous activities of the Boards should be hived off. He thought that competition which took place between the Boards and private industries or shops, particularly in the electrical industry, was unfair, and that activities of the Boards should also be submitted to the Monopolies Commission.

Dealing with decentralisation, Mr. Albu said he saw no reason why the Minister of Fuel and Power should not be the chairman of the Transport

Commission, the Gas Council and the British Electricity Authority, as an ever greater part of the day-to-day policy and management was decentralised to the regional organisations of those industries.

But later, Mr. Oliver Lyttelton stressed that to localise, or decentralise, was the opposite of nationalisation. It was his view, too, that labour relations of the nationalised industries, largely because of the size of the industries, were not what they should be, and must be improved. He also instanced the mounting administrative expenses of the Boards, and after stating that under the B.E.A. works cost of generation rose from 0·515d. p.u. in 1948 to 0·552d. in 1949, he made the point that the increase in the proportion of non-productive to productive staff in the industries needed examination. The matter of the transfer of reserve funds from South East Scotland to the B.E.A. was also again raised by Lord John Hope. Another member, Mr. MacColl, suggested multi-purpose consumers' councils to cover all the nationalised industries.

Replying, Mr. Noel-Baker pointed out in regard to the electricity industry that 15,000 people who were not counted in before vesting day were included afterwards. The 44-hr week had added another 7,000 employees but the number of personnel was increasing in a smaller proportion than the rate at which electricity was being sent out.

Load Shedding

Answering a question by Mr. Granville, the Minister of Fuel and Power said he was aware that recent load shedding had caused some loss of industrial production, but it was impossible to segregate industrial supplies entirely. He understood from the B.E.A. that the rate of commissioning of new generating plant was increasing monthly, and was keeping pace with the capacity of the manufacturers and civil engineers to install and erect new stations.

Cases in Court

Alleged Embezzlement

What was described by the prosecuting solicitor as a most deliberate system, very ingenious and well conceived, was alleged at Nottingham Guildhall last week, to have been used by G. E. Eyre, a former clerk to the East Midland Electricity Board, who was accused of embezzling four sums of money received by him on behalf of the Board, of fraudulent conversion of two cheques, and other offences. The defendant was sent for trial at the City Quarter Sessions on 12 charges. He had been employed at the Board's Nottingham Sub-area office as a consumer's accountant clerk.

After the sub-area accountant had been through the accounts and ledgers, Eyre was interviewed, during the course of which, it was alleged, he said he wanted to make a clean breast of things.

In a statement, it was alleged that Eyre admitted that he started taking the Board's money in 1949. He used to issue a receipt to the consumer for his account without completing the carbon copy, which was retained in the receipt book, without paying the item into the office.

At the end of the quarter this consumer would then be shown in his ledger as in arrears. He then made a fictitious posting against the account early in the next quarter, so that no one would send that person a reminder. At the end of the quarter he would collect that person's actual amount and if it was sufficient to clear the previous quarter's account, that would be done. And at the end of that quarter the account would again be in arrears. This went on until he got so involved, as time went by, that his only hope was to have a large win in a football pool, he stated. The prosecution alleged that the total deficiency was £480 18s. 3d.

Unauthorised Person at Substation

The National Coal Board was fined a total of £105, plus costs, in a reserved judgment at Whitchurch (Cardiff) magistrates' court last week, when it was found guilty of contravening Electricity Regulations of the Factories Acts. The Board was charged with allowing unauthorised persons who were not under authorised supervision to enter a substation where there was danger, for which they were liable, and in consequence of the first offence a man was injured.

The charge arose out of an incident when labourers were spreading ashes from a lorry at Nantgarw substation, near Nantgarw Colliery. A labourer caught hold of the handle of a lorry door, receiving an electric shock and burns, as a result of which he had to have an arm and two toes amputated. It was found that the lorry was in contact with live 33 kV electrical apparatus. The labourer was pulled away by Mr. V. G. Hayward, chargeman electrician at Nantgarw. For the Coal Board, regret was expressed at the accident, and appreciation of the bravery of Hayward.

Deposits for Wiring Work

Judgment was reserved in an action at Dudley County Court last week, in which F. Wooldridge sued Samuel Hunt, trading as Midland Electrics, of 52 Frederick Road, Stechford, for the return of 30s. deposit for the wiring of a council house of which he was the tenant. It was stated that there might be 150 similar claims; there were already 84 claims in the first instance, the facts of which were common. The reason for the work not being completed, it was said, was due to a change in policy of the Dudley Council. Hunt told the court that had he been allowed by the local council to go ahead with the installation for which he had contracted, the work would by now have been completed. He had anticipated permission being given for the installation of wiring, and was still prepared to do the work if allowed.

Electric Supply News

Aberdeen

The new substation at Craigiebuckler, was put into operation by the North of Scotland Hydro-Electric Board recently, thereby increasing the supply to the Aberdeen area by 15,000 kW. Power is taken into the substation via a 132 kV o.h. line from Fannich and Pilochry. A second line is to run to Dundee, and eventually the substation will have a capacity of 90 MW.

Chester

In regard to the supply of 5,000,000 gallons of water p.a. from the River Dee to the Atomic Research Station at Capenhurst, Wirrall, the Ministry of Health has now approved the works necessary which include using the present hydro-electric works at Chester as a pumping station.

Eire

An E.C.A. film unit is to begin work this month on a documentary film on rural electrification and power generation by turf.

Surveyors are at present taking levels and making preliminary tests to find satisfactory foundations in a prospective hydro-electric scheme on the River Mourne, at Mulvin, four miles from Newtownstewart.

Farningham

The Residents' Committee of East Hill and Knatts Valley, near Farningham, have been told that a £12,000 electricity scheme for the area has been postponed by the S.E. Electricity Board following instructions from the Government to exercise economy. It was stated that 15 years might elapse before the district, only 20-odd miles from London, could be supplied. It was decided to protest to the Minister of Fuel and Power.

Keadby

The B.E.A. has now received the consent of the Minister of Fuel and Power to the development of the Keadby power station, Lincolnshire, to its full capacity. Thus authorisation is now given for the installation of two more 60 MW turbo-alternators (to bring the station's capacity up to 360 MW) and two 550 klb/hr boilers. The first set and boiler of this station are due for commissioning next year, and further units will follow in subsequent years, the station being due for completion by 1955.

Leicester

Hope of a reduction, and perhaps elimination of smuts, grit and cooling tower vapour from Leicester power station were held out by representatives of the B.E.A. when meeting the local residents' protest committee recently.

Malvern

There is mounting public opposition to the revised scheme of the Midlands Electricity Board to take power over the hills into rural parts of Herefordshire by means of overhead lines and pylons via the Pink Cottage valley, a noted beauty spot. Authorities still affected are the Worcestershire and Herefordshire County Councils, the Malvern Hills Conservators, the National Trust and the Fastnor Estate. The Worcestershire C.C. have decided to oppose the new proposals. They think that the line as proposed would do more harm to amenities than the original one.

Manchester

The first British scheme for bunkering of a power station by conveyor direct from the pithead is expected to go into operation within the next few days. The station—Stuart Street—will obtain fuel via an underground conveyor 717 yards long from Bradford Colliery. The project was fully described in our issue of August 4, 1949.

N. of Scotland

The North of Scotland Hydro-Electric Board has extended its distribution lines in Aberdeenshire to take electricity to Rothienorman. Some 40 homes are taking a supply.

LIGHTING SCHEMES

Arbroath.—The T.C. has been recommended to approve a scheme for the conversion of street lighting to electricity, at a cost of £8,200.

Budleigh Salterton.—The U.D.C. is to enquire the cost of street lighting by electricity in place of the existing gas system.

Kidsgrove.—U.D.C. to apply for sanction to borrow £3,208 for street lighting on housing estates and trunk roads.

Macclesfield.—The T.C. is recommended to approve the installation of fluorescent lighting in Chestergate and Castle Street, at an estimated cost of £1,705.

Middlesbrough.—The T.C. is considering the installation of lighting on South Bank Road. The borough engineer has submitted various schemes, their cost ranging from £2,430 to £2,660.

Richmond (Surrey).—The Council has agreed to street lighting improvements in Mortlake Road, Kew, between Taylor Avenue and Lower Richmond Road.

Sedgley.—The U.D.C. is shortly to invite tenders for street lighting in Jews Lane, Robert Street, etc.

Southport.—The Lighting Committee has approved the installation of sodium lighting for the Liverpool Road extension from Waterloo Road. Similar lighting will be put in Sussex Road, Union Street, Hill Street and Preston New Road.

The committee also approved the Heathfield Road housing estate electric lighting scheme.

Warsop.—The U.D.C. has instructed the surveyor to prepare a scheme for the conversion of street lighting from gas to electricity, using the existing standards as far as possible.

Wigan.—The R.D.C. has been given approval to install 57 street lamps and 30 relay switches at a cost of £2,000.

Company Activities

British Electric Resistance Co.

Consolidated trading profit for the year to July 31, last, amounted to £30,560, as compared with £38,310 in the previous year. Of this total £20,717 (*£26,437*) was due to the parent company and £9,843 (*£11,863*) to British Power Transformer. After charging directors' remuneration, audit fee, bank interest, £2,478 (*£2,407*) to depreciation and amortisation, and £4,100 (*£4,508*) to taxation, the net profit is £16,252, as against £22,501. Transferred to reserve for income tax is £5,400 (*£10,500*), dividend equalisation reserve £2,500 (*same*), general reserve £2,500 (*£3,000*), and final dividend 15%, making 20%, £5,500 (*same*), leaving the sum of £8,264 (*£7,912*) carried forward.

Cawnpore Electric Supply Corpn.

The United Provinces Government has offered approximately £2,135,000 for the undertaking, an offer which has been accepted, shareholders were told at the meeting last week. It is understood that the chairman expects shortly to make a distribution of 60s. per £1 stock unit, to be followed later by perhaps another 40s.

East African Power and Lighting Corpn.

The report for 1949 again reflects continued expansion, sales of electricity being 29·8% above the total for 1948, the ratio of operating costs, however, particularly labour and fuel, is still increasing. The group operating surpluses and sundry receipts for 1949 were £465,009, as against £349,746 in 1948. Expenses absorb £65,868 (*£51,488*), depreciation of fixed assets, etc., £126,464 (*£109,378*), and after allowing for other charges, the net revenue is £267,908 (*£173,903*). After payment of dividends already announced there is £20,870 (*£12,551*) carried forward by the subsidiaries, and £93,650 (*£73,419*) by East African P. and L. Group fixed assets are listed at £2,750,025 (*£1,740,274*). The directors are now preparing for their next capital issue. Shareholders are asked to approve the increase of £2,000,000 in the authorised capital—which may be issued as Preference or Ordinary when the time comes. The company's last issue, of £1,000,000 Preference and £1,000,000 Ordinary, was made in October, 1949.

Falk Stadelmann & Co., Ltd.

The question of increasing the capital is again referred to by Mr. Hugo Falk in his report. He points out that the company is still working with practically the same share capital as in 1928. In view of the works modernisation scheme, and the opening of new factories and the research work continuously undertaken, the Board has decided that additional capital is now required, and particulars of the proposal will shortly be issued. The consolidated balance sheet for the year ended March 31 shows that the profit and other income dropped by £35,053 to £484,826. After charging £57,729 (*£69,911*) to depreciation of fixed assets, £3,500 (*nil*) to provision for subsidiary companies' pension and benevolent funds, and £196,940 (*£236,024*) to taxation, the net profit is £162,269 (*£149,390*). After payment of dividends, including Ordinary 15% (*same*), transferring £50,000 to general reserve, and £29,612 to contingencies reserve, there is £253,940 (*£231,778*) carried forward. In his report, Mr. Hugo Falk explains that extensions to several factories have been necessary to house new plant, in particular at the Electric Fittings Works, Birmingham, the Wandsworth Cable Works, and the Rainhill Cooker Works.

London Electrical and General Trust

Income for the year ended June 30 at £67,304 was £3,697 more than for the previous year, while expenses remained about the same. Income tax absorbs £20,496, as against £18,887, and after payment of debenture interest and Preference dividends, £15,250 remains, equivalent to earnings of 11·5% gross on the Ordinary stock. £5,000 is transferred to the reserve account. In view of the good position, the directors proposed to raise the final dividend from 4% to 5%, making 7% for the year, Sir Arthur Guinness, chairman, stated at the meeting last week.

Madras Electric Supply Corpn.

At last Thursday's meeting of stockholders, it was agreed to accept the Madras Government's offer of £1,612,500 as the purchase price for the undertaking (which we reported on October 19). The amount payable by the Government for the service lines is to be referred to arbitration.

Reliance-Clifton Cables and Industrial Products

The group accounts cover the parent company for the eight months to November 30, 1949, and subsidiaries for a full year to that date. Trading profit of the subsidiaries was £229,911, as against £202,340, plus miscellaneous income £2,948 (*£3,864*). Expenses, emoluments, interest and depreciation takes £35,337 (*£22,286*), taxation £102,901 (*£97,068*) and outside holders £1,155 (*same*), leaving the group net profit of £93,466 as compared with £85,695.

Dividends Declared

W. Canning and Co. Interim dividend of 5% (*same*), payable on November 30.

Drake and Gorham Ltd. Dividend of 5% (*same*). Group profit after charging taxation is £14,158, against £21,836.

Electric and Musical Industries. Ordinary dividend of 6% and bonus 2% (*both same*). Group profit is £470,301 (*£670,402*).

Garrard Engineering. Interim dividend of 12½% (*same*).

Senior Economisers. Interim dividend of 30% (*35%*), payable on November 23.

Commercial Information

CONTRACTS OPEN

HOME

Nov. 3.—Altrincham T.C. Supply, erection and wiring of five steel columns with projection brackets, laying of 220 yd. of two-core underground cable, and fixing of five fluorescent street lighting lanterns with lamps and ancillary equipment on Approach Rd. to Old Hall Hotel. Borough Surveyor's Dept., Town Hall.

Nov. 4.—Peterborough. Electric lighting and power installations to 104 houses on Eastfield estate. F. J. Smith, City Engineer and Surveyor, Town Hall. Deposit £2 2s. (See Oct. 26 issue.)

Nov. 6.—Andover T.C. Two electrically operated submersible pumps, and two electrically driven, horizontal spindle, centrifugal pumps, all capable of 40,900 g.p.h. and with automatic control gear, delivery pipes, valves, etc. R. S. Offord, Borough Surveyor and Water Engineer, "Beech Hurst," Weyhill Rd., Andover. Deposit £2 2s.

Nov. 6.—Friern Barnet U.D.C. Supply of eighty columns and lanterns, the latter suitable for 60 W sodium lamps for side road lighting. J. Marshall, Engineer and Surveyor, Town Hall, N.11. (See Oct. 26 issue.)

Nov. 6.—Heston and Isleworth. Removal of existing columns and lanterns and supply of 72 street columns and 76 lanterns with 400 W mercury vapour discharge lamps along Bath Rd., Cranford. Borough engineer and surveyor, 88 Lampton Rd., Hounslow. Deposit £2 2s. (See Oct. 19 issue.)

Nov. 6.—Tullamore (Co. Offaly). Electrical installation in new Extension Vocational schools. Consulting Engineer, J. V. Tierney, 15 Duke St., Dublin. Deposit £3 3s.

Nov. 6.—West Riding. Electrical installation in Goole Boothferry Rd. primary school. County Architect, Bishopgarth, Westfield Rd., Wakefield. Deposit £1 1s.

Nov. 7.—Gillingham T.C. Electrical installation in Featherby Rd. infants school. Borough engineer and surveyor, Municipal Bldgs. Deposit £3 3s.

Nov. 10.—Maidenhead T.C. Mercury vapour street lighting on Castle Hill (A.4), comprising erection of reinforced concrete columns and of lanterns and fittings, including wiring. Borough Engineer and Surveyor, C. T. Read, 14 Cranfurd Rise, Maidenhead. Deposit £2 on each part.

Nov. 10.—Norton R.D.C. Electrical installations to 8 houses at Sherburn. Council's Arcnitect, Alderson and Allen, 32 St. Nicholas St., Scarborough.

Nov. 11.—Bedworth U.D.C. Erection of 105 reinforced concrete lamp columns 25 ft high and installation of 400 W mercury vapour discharge lamps and equipment for part of Caldecote-Coventry-Blackdown Road (A444). Engineer and Surveyor to the Council, 134 Newtown Rd., Bedworth, nr. Nuneaton. Deposit £3 3s. (See Oct. 26 issue.)

Nov. 11.—Rotherham R.D.C. Electrical wiring of 99 bungalows in various parishes. John E. Nicholson, Estate Maintenance Clerk of Works, 4 South Terr., Moorgate, Rotherham. Deposit £1 1s.

Nov. 11.—Westhoughton U.D.C. Supply and erection of 175 reinforced concrete street lighting columns and installation and wiring of lighting fittings, also supply of enclosed refractor-type lanterns, lamps and auxiliary equipment, on Manchester and Chorley Roads (A6). F. H. Walker, Engineer and Surveyor, Town Hall. Deposit £2 2s.

Nov. 13.—Dublin. Electrical installation in nurses' home at Orthopaedic Hospital, Clontarf. Violet M. Johnston, secretary, Inc. Orthopaedic Hospitals of Ireland, Castle Ave., Clontarf, Dublin. Deposit £5 5s.

Nov. 14.—Dublin. Electrical installation for new unit at St. Kevin's Institution and extension of installation on ground floor of the Acute Hospital at the same Institution. Consulting Engineer, N. Mathews, 104 Grafton St., Dublin. Deposit £10 10s.

Nov. 14.—Sheffield T.C. Supply of 50 steel tubular tramway poles and five pairs of tramway points. R. C. Moore, General Manager of Transport Dept., Division St., Sheffield 1.

Nov. 16. — Nottinghamshire. Mining and engineering machinery and equipment for Mansfield Tech. College. Divisional Education Officer, Education Office, Mansfield. (Advertised in this issue.)

Nov. 16.—Bridgend U.D.C. Supply, erection and setting in operation of street lighting at Ewenny Cross roundabout (A.48) comprising 140 W sodium cut-off lanterns on 25 ft concrete columns. D. J. Amos, Engineer and Surveyor to Council, Council Offices, Glan-Ogwr, Bridgend. (Advertised in this issue.)

Nov. 17.—Belfast. Supply of domestic refrigerators to N. Ireland Tuberculosis Authority. William Harvey, secretary, 27 Adelaide St., Belfast.

Nov. 18.—Limerick. Electrical installation at Mount St. Alphonsus College. C. Thompson, Architect, 65 O'Connell St., Limerick. Deposit £5 5s.

Nov. 18.—Portadown. Erection of vehicle-actuated traffic signals at two points. Borough Engineer and Surveyor, Charles Mackinder, Tavanagh House, Portadown.

Nov. 20.—Glenrothes. Electrical installation in 140 houses at Woodside. Secretary, Glenrothes Development Corporation, Woodside, Glenrothes Fife. Deposit £2 2s.

Nov. 22.—Romford T.C. Electrical installation to 92 houses on Masefield Cres. estate. Borough Engineer and Surveyor, Town Hall. Deposit £2 2s. (Advertised in this issue.)

Nov. 24.—Belfast. Fire-fighting equipment for protection of 33 kV switchgear for Mountpottinger substation. Thorndyke St. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-on-Tyne 1. Deposit £5 5s. (See Oct. 19 issue.)

Nov. 24.—Bedfordshire. Installation of electric lighting to county primary school at Leighton Buzzard. County Architect, Shire Hall, Bedford.

Nov. 24.—Stockport T.C. Supply and erection of 200 lighting

columns and installation of lanterns and control gear. Also supply of 200 lanterns, chokes and capacitors for 400 W horizontal mercury vapour discharge lighting. Wm. F. Gardner, Borough Surveyor, Town Hall, Stockport. (Advertised in this issue.)

Nov. 29.—Clondalkin (Co. Dublin). Electrical installation in Dublin Fever Hospital at Blackditch. J. A. Kenny and Partners, consulting engineers, 44 Kildare St., Dublin C.17. Deposit £26 5s.

Dec. 2. — Newcastle - on - Tyne. Electric lighting and power installation at Ravenswood Rd. county primary school. Apply by Nov. 4, giving evidence of contracts exceeding £5,000 in last five years. R. W. Gregory and Partners, Education Dept.'s Consulting Engineer, Northumberland Rd. Deposit £5 5s. (See Oct. 19 issue.)

Dec. 8.—Belfast T.C. Supply and erection of vertical spindle centrifugal type drainage pumps, pipework and equipment at Harbour power station. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-on-Tyne 1. Deposit £5 5s. (Advertised in this issue.)

Dec. 11.—Dublin. A.C. motor-d.c. generator set direct coupled on combination bed plate. D.C. generator - compound wound continuously rated 5 kW, 110 V. Technical Schools, Bolton St., Dublin.

Dec. 13.—Aireborough U.D.C. Reinforced columns and brackets, also supply of lanterns and auxiliary gear for installation of fluorescent street lighting along 2½ miles of Leeds Rd. Engineer and Surveyor to Council, Council Offices, Rawdon, nr. Leeds. Deposit £2 2s. (See Oct. 12 issue.)

No date stated.—Carlisle T.C. Electrical installation in 42 houses. City Engineer, 18 Fisher St.

No date stated.—Roxburghshire. Electrical installation in 6 houses for Forestry Commission (Scottish Division). John A. W. Grant, chartered architects, 36 Melville St., Craik.

No date stated.—Seaton Valley U.D.C. Electrical goods for 60 houses. Surveyor, Council Offices, Seaton Delaval, Northumberland.

No date stated.—Melrose T.C. Electrical installation in 12 houses at Priors Walk. F. P. Smart, Town Clerk, Town Clerk's Office, Melrose.

No date stated.—Aberdeen. Electrical engineer work for restoration of Middlefield primary school. J. A. O. Allan, Ross and Allan, architects, 10 Bon-Accord Sq., Aberdeen.

OVERSEAS

*Details of items marked * may be obtained on application to Room 1076, Board of Trade, Thames House, North Millbank, S.W.1, quoting reference.*

Nov. 6.—India. Meter testing bench for calibrating 3-wire meters up to 200 A, 500 V; 12 portable precision transformers; voltage regulator; megger testing set 5,000 V; 2 potentiometers-voltage divider; 6 rheostats; 6 voltmeters; 6 ammeters; and a.c. potentiometer set for Mysore Stores Purchasing Committee, Bangalore. B.o.T. (Ref. CRE (IB) 68010/50).*

Nov. 9.—Portuguese East Africa. Generating set—diesel alternator—control and distribution panel for generating centre for supply of power to Bela Vista, Maputo. Permanent Purchasing Commission, Mozambique Treasury Dept., Lourenco Marques.

Nov. 14.—Wellington (N.Z.). Supply of 4,521 secondary lead-acid cells in 10, 20, 50, 75 and 125 A ratings. Director General (Stores Division), G.P.O., Wellington, C.1.

Nov. 21.—Pakistan. Switchboard equipment, cables and transformers for Chittagong power station. Documents at Office of High Commissioner, 40 Lowndes Sq., S.W.1.

Nov. 23.—Wellington (N.Z.). Supply 2½ miles of switchboard wire, No. 21 s.w.g. conductor, single, tinned, enamelled, conductor covering, type 4. Director General (Stores Division), G.P.O., Wellington C.1.

Nov. 30.—New York. Twelve console units and 60 simultaneous interpretation units for United Nations. B.o.T. (Ref. CRE (IB) 68126/50).*

Dec. 14.—Johannesburg. Supply of 100,320 yd of indoor cable, p.v.c. insulated and sheathed for Dept. of Posts and Telegraphs.

Jan. 27.—Pakistan. Supply of 32 metre gauge (3 ft 3⅜ in.) express and goods diesel electric locomotives for Eastern Bengal Railway. Documents from Supply and Stores Dept., Office of High Commissioner for Pakistan, 40 Lowndes Sq., S.W.1. Deposit £15.

March 20.—Wellington (N.Z.). 100 MVA, 11,000 V switchgear of single busbar indoor metal clad drawout type with accessories, comprising a 6-panel switchboard (1 incoming panel and 5 feeder panels), bus oil immersed isolator switch, bus potential transformer, outdoor current transformer. State Hydro-Electric Dept.

Your Queries — Answered

"Clan" brand toaster, makers of? E.B.—J. A. Brooke and Co., Longride, Old Woking Rd., Pyrford, Surrey. (18926)

"Dimit" dimmer, makers of? E.C.—Rynford Industries Ltd., 17 Arwenack St., Falmouth, Cornwall. (18929)

"Hesco" pads, suppliers of? E.B.—Hornby Electrical Supplies Co. Ltd., 21 St. Annes Court, W.1. (18934)

Meters, all types, repairers of? F.H.—J. W. Hughes, 3 St. Thomas' St., London, S.E.1.; White Electrical Instrument Co. Ltd., 10 Amwell St., E.C.1; Runbaken Electrical Products Ltd., 71 Oxford Rd., Manchester 1. (18938)

"Ferns" emulsifier, makers of? B.D.—This machine was taken over from Ferns Ltd. by Morton Machine Co. Ltd., Glasgow Rd., Wilshaw, Scotland. (18943)

"Cuisiniere" cooker, makers of B.C.—This porringer type cooker was made by the Eralite Mfg. Co. Ltd., a firm which went out of business about two years ago. (18949)

"Nichro" fire, makers of? F.W.—Cranmer and Cheshire Ltd., Steward St., Springhill, Birmingham 4. (18955)

"V" cookers, makers of? S.C.—These were made during World War II to Government specification by all the leading cooker manufacturers in quotas according to capacity. (18960)

The above are selected from questions we have answered this week. If you have a query, send it to us.

CONTRACTS PLACED

Birkenhead. Electrical installations at Kirklands secondary school. Fox and Co. (Childwall) Ltd., £1,126.

Cardiff. Lift for City Council. Express Lift Co., Ltd., £1,356.

Newcastle-on-Tyne. Five 10-ton electric cranes for Tyne Improvement Commission. Stothert and Pitt, Ltd., £257,500.

West Hartlepool. Installation of electric light at Brougham county primary school. North of England Engineering and Electrical Co., Ltd., Ferryhill.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Geoffrey Allison Ltd., 90 Cheapside, Worksop. To carry on business of dealers in, repairers and manufacturers of radio, television, gramophone and electric goods and accessories, etc. Nominal cap.: £2,000 in £1 shares. Dirs.: G. Allison and Mrs. E. Allison.

Cine Television Equipment (Overseas) Ltd., 17 Farringdon St., E.C.4. Nominal cap.: £5,000 in £1 shares. Dirs.: D. M. Russell and T. M. Russell.

J. W. Collins and Sons Ltd., 6 Parkmore Terr., Hassocks, Sussex. To take over business of electrical engineers and contractors and radio sales and repair specialists carried on at Hassocks and Keymer, Sussex, as "J. W. Collins and Sons." Nominal cap.: £1,000 in £1 shares. Dirs.: J. W. Collins and W. F. Shafer.

Electronikos Ltd., 7 Coolinge Rd., Folkestone, Kent. To carry on business of designers, manufacturers of electronic equipment, hearing aids for the deaf, electro-therapy equipment, etc. Nominal cap.: £500 in £1 shares. Dirs.: J. E. Watson, R. A. Prior, A. E. Wighton and H. S. Gallagher.

Lymelite Electrical Industries Ltd., 15 Highbury Quadrant, N.5. Nominal cap.: £4,000 in £1 shares. Dirs.: M. Alder, A. Karat, F. G. Moon and D. A. V. Rist.

Halmatic Ltd., 8 Southampton Pl., Bloomsbury Sq., W.C.1. To carry on business of manufacturers of and dealers in light electrical equipment, plant, machinery, etc. Nominal cap.: £1,000 in £1 shares. Dirs.: to be appointed by subscribers.

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Wednesday morning)

	£ s. d.	New York price
COPPER, electrolytic	202 0 0	£196 0 0
Delivered in 2nd and 3rd month after order	215 10 0	—
Delivered in 4th, 5th and 6th month after order	217 0 0	—
LEAD, good soft pig (foreign)	136 0 0	128 0 0
" "English" quality	129 10 0	—
Delivered in 2nd and 3rd month after order, plus	7 0 0	—
TIN (99-99.75%) (Cash)	983-985	—
(3 months)	950-953	—
ALUMINIUM, commercial purity (del.)	120 0 0	—
ZINC	151 0 0	140 0 0
ARMOURING:		
Galv. Steel Wire (0.104 in.)	45 10 0	—
Mild Steel Tape (0.04 in.)	26 0 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Cawnpore Electric Supply Corporation Ltd. Resolution for voluntary winding-up passed at a meeting on Oct. 25. Alan Lancelot Browse Tucker, Orient House, New Broad St., E.C.2, and D. C. Wilson, Winchester House, Old Broad St., E.C.2 appointed liquidators.

Camley Engineering Co. Ltd. Meeting of creditors will be held at The Law Institute 1, Albion Place, Leeds, on Nov. 10 at 3.30 p.m.

Dunedin Holdings (London) Ltd., proprietors of Epheta Manufacturing Co., 64 Newman St., W.1. Creditors and contributories at Inveresk House, (Room 401), Strand, W.C.2, November 3, at 2.30 and 3 p.m. respectively.

BANKRUPTCY ACTS

Receiving Orders

Sheffield. Rotherham Electronic Service, electrical, radio and television engineers and neon sign specialists, of 46 Kimberworth Rd., Rotherham. Date of receiving order, Oct. 24.

Wandsworth. H. Walby, electrical engineer, of 86 Hill Rise, Richmond. Date of receiving order, Oct. 19.

Intended Dividends

Plymouth. James Henry Trevithick, electrician and partner in firm of Power, Light and Sound, at 51 Fore St., Callington. Last day for receiving proofs. Nov. 10. Trustee: Felix B. Goodman, Official Receiver, 24 Lockyear St., Plymouth.

Plymouth. John Theodorius Southwood, trading as electrical engineer at Belgrave Garage, Mutley, Plymouth. Last day for receiving proofs, Nov. 10. Trustee: Felix B. Goodman, Official Receiver, 24 Lockyear St., Plymouth.

Application for Discharge

Blackburn. Herbert H. Baron, electrician, at 84 Duckworth St., Darwen. Hearing at County Court House, 64 Victoria St., Blackburn, on Nov. 13, 10.30 a.m.

Appointment of Trustees

Salisbury. John Stewart Anderson, trading as "Electronic Services" at "Nearavon," Salisbury St., Fordingbridge. Trustee: Alfred H. Brown, The Square, Fordingbridge, Hants.

TRADE NOTES

Lead.—The price of lead was increased by £8 to £136 a ton as from November 1.

Changes of Address.—Wheeler Electrical Supplies (Wholesale) Ltd. are shortly moving to larger premises at "The Electrical Warehouse," 150 Burton Rd., Derby.

The Elkay Electrical Manufacturing Co. Ltd. has moved to 42 Woburn Place, W.C.1. Telephone: Langham 1975.

Acquisition.—The Ajax Machine Tool Co. Ltd., proprietors of the Ajax Domestic Appliance Co., has been acquired by the Aurochs Investment Co., for the sum of £400,000, it is reported. Formed in 1940, the company started producing washing machines in 1945. Mr. G. Carter remains managing director of the new company which is being formed with a capital of £400,000, we understand, with Mr. K. W. Howarth also continuing as a director.

B.E.A.M.A. Contract Price Adjustment Formulae for purposes of calculating variations in: (a) "Rates of Pay"—the rate of pay for adult male labour at Oct. 14, 1950 shall be deemed to be 115s.; (b) "Costs of Material"—the index figure for Intermediate Products last published by the Board of Trade on Oct. 14 is 308.0 and is the figure for the month of Sept., 1950.

BUSINESS PROSPECTS

HOME

Arbroath (Angus) T.C. Dean of Guild Court has approved plans for erection of 18 houses in Dishlandtown St., and 52 houses in Cliffburn Rd., at total estimated cost of £84,522.

Armagh (Tyrone). R.D.C. proposes to erect 100 cottages.

Bacup. Education Executive has agreed to go ahead with proposed nursery school at Waterfoot.

Bilston (Staffs). Erection of 72 houses on Stowlawn site and 8 flats at Temple St. Borough Architect, 20 Wellington Rd., Bilston.

Bristol. S.W. Regional Hospital Board approved provision of school for Stoke Park Colony at estimated cost of £60,000. Also approved plans for erection of school at Hengrove at estimated cost of £50,000.

Cardiff. Erection of secondary modern school in Bridge Rd. City Surveyor, City Hall.

Chingford (Essex). Proposed to erect combined treatment centre to serve Friday Hill estate at estimated cost of £17,000.

Corby (Northants). Congregational authorities to erect church off Studfall Ave. Architects: Talbot Brown, Panter and Partners, 3 Burystead Pl., Wellingborough. Estimated cost £25,000.

Cuckfield (Sussex) R.D.C. Erection of 50 houses at Balcombe. A. Hutchings, Engineer and Surveyor, Rural Council Offices, Boltro Rd., Haywards Heath.

Dorset. It is proposed to erect Westham primary school on Weymouth grammar school playing fields.

Dudley (Worcs). T.C. to erect 60 flats on four sites. Estimated cost is £76,016.

East Retford (Notts). R.D.C. to apply for sanction to borrow £91,535 for erection of 16 houses at North Leverton, 10 at South Leverton, 8 each at West Stockwith, Rampton and Scrooby, 7 at Finningley, 5 at Clayworth and 3 at Normanton.

Ellesmere Port U.D.C. Erection of 33 flats on Stanney estate. Council's Engineer and Surveyor, Queen St.

Erpingham (Norfolk) R.D.C. Plans approved for erection of 6 houses at Mundesley, 4 each at Plumstead, Beckham, Bodham, Holt, Erpingham and Gimingham, 2 each at Weybourne, Thornage and Thorpe Market, and 2 houses and 2 bungalows at Overstrand.

Falkirk T.C. Dean of Guild Court has approved erection of 40 houses at Easter Carmuirs and 2 at David's Loan.

Fife. Proposal approved to erect secondary school in Glenrothes area and Woodside primary school.

Gillingham T.C. Permission has been granted for erection of a further 83 houses on Eastcourt-Twydall estate.

Great Yarmouth. Erection of 98 houses at Magdalen College estate. Borough Engineer, Town Hall.

Keighley. All trades in erection of county junior school on Bracken Bank estate. E. G. Felgate, Borough Architect, College St., Keighley.

Kilkeel (Co. Down). R.D.C. proposes to erect 138 houses; plans approved for erection of 22 houses at Rostrevor and 16 at Ballymartin.

Leigh. T.C. to install electric lift in Town Hall. Estimated cost, £4,000.

Leyland (Lancs). Erection of junior school at Earnshaw Bridge at estimated cost of £64,000.

Lincolnshire. Erection of new school at Cleethorpes. W. Saunders and Partners, Quantity Surveyors, 14 Mercer Row, Louth.

Milnrow U.D.C. Erection of 50 flats on Firgrove estate. Council's Surveyor, Council Offices, Milnrow.

Morecambe and Heysham. Town Clerk is obtaining estimates for rewiring electrical installations in Happy Mount Park.

Newcastle-on-Tyne. Erection of secondary modern school on Blakelaw estate.

North Riding. Erection of Guisborough county primary school. Architect: William Tocher, 8 Blenheim Terr., Leeds 2.

St. Faiths and Aylsham (Norfolk). R.D.C. to erect 10 houses each at Sprowston, Hellesdon and Foulsham, 8 each at Aylsham and St. Faiths, 6 at Buxton and 4 at Cawston.

Stanley (Durham) U.D.C. Tenders to be invited for erection of 50 houses at South Stanley.

Walton and Weybridge U.D.C. Erection of 24 houses on Foxholes estate. Engineer and Surveyor to the Council, Council Offices, Walton-on-Thames.

Wirral U.D.C. Erection of 28 houses and 16 bungalows on Irby Rd. estate. W. F. Roberts, Clerk of the Council, Council Offices, Heswall, Wirral.

Woodford (Essex.) Approval has been received for erection of children's day nursery in Roding Lane at estimated cost of £14,000.

OVERSEAS

Egypt.—African Enterprises and Development Co. wishes to obtain agencies of U.K. manufacturers of electrical fittings. Contact the managing director, Mr. Marcel J. Hermand, at Heliopolis Palace Hotel, Cairo.

France.—Domestic refrigerators, compressors and electric motors for industrial and commercial cold storage rooms wanted by Frigibel, S.A.R.L., of 14 Rue Duffour-Dubergier, Bordeaux.

U.S.A. Retailers Marketing Guild, Inc., Room 1801, Merchandise Mart, Chicago 54, are interested in obtaining electrical and other household appliances which are priced right and styled for the American market, which U.K. manufacturers could guarantee and for which they could provide spare parts service.

Also, the Universal Match Corporation, P.O. Box 191, Ferguson 20, Missouri, want 11,500 carbon insulated resistors of ½ and 1 W sizes; 25% of the order is required immediately, the remainder to follow before the New Year.

The Coast to Coast Stores, 29 South East Main St., Minneapolis want to contact U.K. suppliers of electric clocks, lamps and fluorescent lighting fittings.

Electrical construction materials (wire, conduit, fittings, switches, etc.) are wanted by the Sanderlin Co., 129 First Ave. W., Seattle 99, Washington, and by Bruce-Emmett Co., 830 S.E. Alder, Portland, Oregon. Also the Northwest Sales and Engineering Co., 915 Terminal Sales Building, Seattle want supplies of electrical and refrigeration goods.

MEETINGS TO NOTE

THURSDAY, NOV. 2

A.S.E.E. (S. London Branch).—"Prevention of Electrical Accidents," Col. Emerson. Café Royal, Croydon.—8 p.m.

BRITISH INSTN. OF RADIO ENGRS. (Merseyside Section).—"Propagation of Metric Waves Beyond Optical Range." D. W. Heightman, Elect. Board, Whitechapel, Liverpool. 6.30 p.m.

BRITISH INSTN. OF RADIO ENGRS. (N. Western Section).—"Communication Cables." W. R. Cooper, College of Technology, Manchester. 6.45 p.m.

DUNFERMLINE ELECT. SOC.—"Stage Illusion." Prof. M. G. Say. Unitas Hall, Queen Anne St., at 7 p.m.

I.E.S. (Birmingham Centre).—Demonstration and display of new lighting equipment. Midland Elect. Board, 21 Paradise Street.

I.E.S. (Cardiff Centre).—Film evening. S. Wales Elect. Board, The Hayes 5.45 p.m.

I.E.S. (Exeter Group).—"Application of Fluorescent Lamps to Street Lighting." N. W. Wood. Agricultural House, Queen St. 7 p.m.

INST. OF ENGRNG. INSPECTION.—"Inspection in Welding." J. C. Cocks. Royal Society of Arts, John Adam St., W.C.2.

I.E.E. (London).—"Education and Training of Electrical Technicians." Sir Arthur P. M. Fleming. Savoy Place, W.C.2. 5.30 p.m.

I.E.E. (E. Midland Centre).—"The Economical Utilisation of Electricity in G.B." R. B. Giles. University Arms Hotel, Cambridge. 7.30 p.m.

FRIDAY, NOV. 3

I.E.S. (Bath and Bristol Centre).—"Application of Fluorescent Lamps to Street Lighting." N. W. Wood, S.W. Elect. Board Showrooms, Bath. 7 p.m.

I.E.S. (Huddersfield Group).—"Colour" W. J. Wellwood-Ferguson. Elect. Showrooms, Market St. 7.15 p.m.

MONDAY, NOV. 6

A.S.E.E. (N.E. London Branch).—"Electricity Control Gear for Resistance Welding." H. E. J. Butler. Angel Hotel, Ilford. 8 p.m.

I.E.E. (N.E. Centre).—Joint meeting with I.M.E. "The Application of Gas Turbine Technique to Steam Power." J. F. Field. Neville Hall, Westgate Rd., Newcastle. 6 p.m.

I.E.E. (N.E. Radio Group).—"Recent Developments in Comparative Methods of Testing A.C. Electricity Meters." S. F. Musson and R. E. Mell. King's College, Newcastle. 6.15 p.m.

I.E.S. (Leeds Centre).—Brains Trust. 24 Aire St., Leeds 1. 7 p.m.

I.E.S. (Liverpool Centre).—"Floodlighting." R. O. Ackerley. Merseyside and N. Wales Elect. Board, Whitechapel. 6 p.m.

I.E.E. (Ipswich District).—"Review of Research in Electricity Supply." C. W. Marshall. Gt. White Horse Hotel. 6 p.m.

I.E.E. (Maidstone District).—"The Measurement of Light and Colour." G. T. Winch. New Inn, Sandling Rd. 7.30 p.m.

I.E.E. (Merseyside and N. Wales Centre).—"Crystal Diodes" by R. W Douglas and E. G. James. "Crystal Triodes" by T. R. Scott. Liverpool Royal Instn., Colquitt St. 6.30 p.m.

I.E.E. (S. Midland Centre).—"Science in relation to the Electrical Industry." W. Wilson. Jas Watt Memorial Inst., Gt. Charles St., Birmingham. 6 p.m.

INC. PLANT ENGRS. (London Branch).—"Thermal Efficiency of combined Heat and Power." Dr. A. C. Dunningham. Royal Society of Arts, John Adam St., W.C.2. 7 p.m.

TUESDAY, NOV. 7

A.S.E.E. (N.W. London Branch).—"Air Conditioning and Applications." H. J. Y. Green. St. Hilda's Hall, Northolt Rd., South Harrow. 7.45 p.m.

ELECT. POWER ENGRS. ASSOC. (Midland Tech. Group).—"Heat Pump." Miss M. V. Griffiths. Recreation Club Rooms, Hylton Rd., Worcester. 7 p.m.

I.E.E. (Discussion Circle).—"Teaching Physics to Engineers." Savoy Place, W.C.2. 6 p.m.

I.E.E. (E. Midland Centre).—"Evolution of the Lighting Art.' J. W. T. Walsh. Elect. Showrooms, Derby. 6.30 p.m.

I.E.E. (S. Midland Centre).—"Science in relation to the Electrical Industry." W. Wilson. Works Inst., Hylton Road Power Station, Worcester. 7 p.m.

I.E.E. (N. Midland Students' Section).—"Surge Phenomena in Power Engineering." A. N. Greenwood. Lighting Service Bureau, Aire St., Leeds. 7 p.m.

WOMEN'S ENGRNG. SOC. (London Branch).—"London's Telephone Service." 35 Grosvenor Pl., S.W.1. 7 p.m.

WEDNESDAY, NOV. 8

A.S.E.E. (Kent Branch).—"Factory Electrical Maintenance." A. C. Witts. Royal Star Hotel, Maidstone. 8 p.m.

A.S.E.E. (Birmingham Branch).—Film on "Portable Electric Tools." Chamber of Commerce, New St. 7 p.m.

A.S.E.E. (Bradford Branch).—"Electrification in the Dales." J. L. Browell. Midland Hotel. 7.30 p.m.

BRITISH INSTN. OF RADIO ENGRS. (N. E. Section).—"Radio Navigational Aids." J. C. Martin. Neville Hall, Westgate Rd., Newcastle. 6 p.m.

I.E.S. (Edinburgh Centre).—"Lighting of Architecture." G. Grenfell Baines. Lighting and Cleansing Dept. High St. 7 p.m.

INSTN. OF HEATING AND VENTILATING ENGRS.—"Domestic Hot Water Supply Code of Practice." W. L. Swain, J. W. Cooling, L. Copeland Watts. Instn. of Mech. Engrs., Storey's Gate, S.W.1. 6 p.m.

I.E.E. (London Radio Section).—"Low-frequency Radio-wave Propagation by the Ionosphere." Caradoc Williams. Savoy Place, W.C.2. 5.30 p.m.

I.E.E. (Oxford District)—"Radio." W. H. Lee. S. Elect. Board, 37 George St. 7 p.m.

I.E.E. (Sheffield Sub-Centre).—Discussion on "Electrical Equipment of a Blooming Mill." Tech. School, Scunthorpe. 7 p.m.

I.E.E. (Scottish Centre).—"Review of some Television Pick-up Tubes." J. D. McGee. Heriot-Watt College, Edinburgh. 7 p.m.

I.E.E. (S. Midland Students' Section).—"Modern Circuit Breakers." R. H. Klotz. Jas Watt Memorial Inst.

NORTHAMPTON ELECT. ASSOC.—"Coloured and Direction Light as applied to the Stage." L. G. Applebee of Strand Electric Co. 7 p.m.

THURSDAY, NOV. 9

I.E.S. (Birmingham Centre).—Ladies' Night Imperial Hotel.

I.E.S. (Glasgow Centre).—"Lighting of Architecture." G. Grenfell Baines. 39 Elmbank Cresent, Glasgow C.2. 6 p.m.

I.E.S. (Leicester Centre).—"Some Aspects of Colour in Relation to Discharge Lamps." A. E. Bird. E. Midland Elect. Board, Charles St. 6.30 p.m.

I.E.S. (Manchester Centre).—"Lighting in the New House of Commons." Veronica Demuth. College of Technology. 6 p.m.

INSTN. OF WORKS MANAGERS (Wembley Sub-branch).—"Diagnosis of Faults in Machinery." G. N. Tilley of Fishers Foils Ltd. "The Plough," Kenton Rd., Kenton. 12.30 p.m.

I.E.E. (London Utilisation Section).—"Some notes on Electrical Installations in Large Chemical Factories." D. B. Hogg. Savoy Place, W.C.2. 5.30 p.m.

I.E.E. (N. E. Scotland Sub-Centre).—"Some Electromagnetic Problems." Prof. G. W. O. Howe. Royal Hotel, Dundee. 7 p.m.

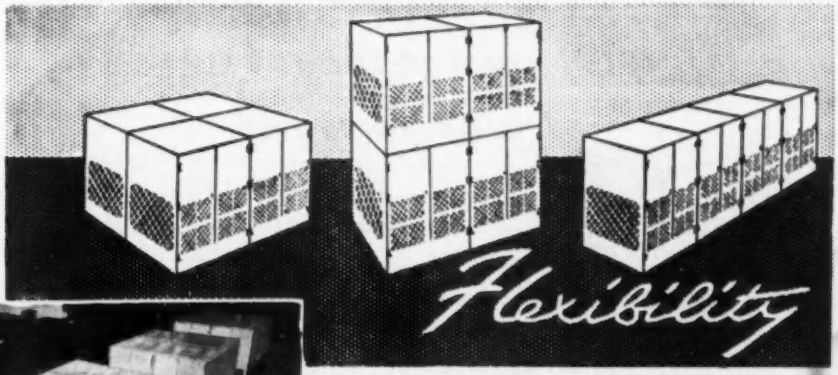
I.E.E. (Rugby Sub-Centre).—"Some Electrical Methods of Measuring Mechanical Quantities." F. J. Woodcock. Elect. Board Showrooms, High St. 6.30 p.m.

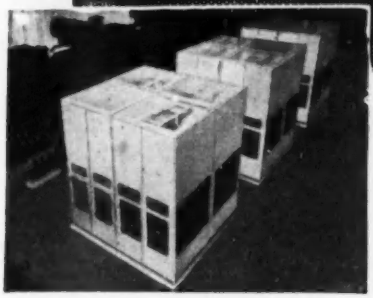
I.E.E. (W. Wales (Swansea) Sub-Centre).—Chairman of Western Centre's address. O. D. Arden. Plaza Cinema, Swansea, 6 p.m.

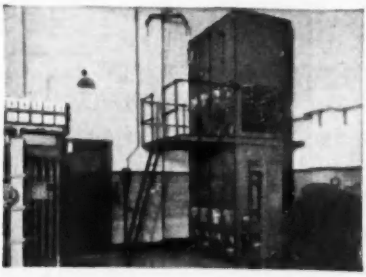
LEEDS ELECT. CLUB.—Dance. Parkway Hotel.

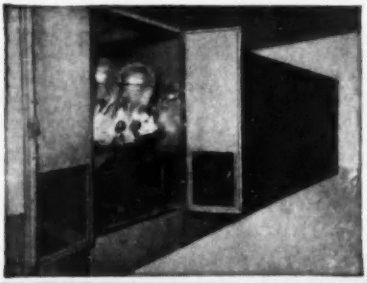
FRIDAY, NOV. 10

I.E.E. (N. E. Scotland Sub-Centre).—"Some Electromagnetic Problems." Prof. G. W. O. Howe. Robert Gordons Tech. College. 7.30 p.m.









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In fact, this unit construction and the simplicity of the individual units have much to do with the reputation for exceptional reliability long enjoyed by

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Telephone: Walton-on-Thames 760 (8 lines) Telegrams: "Electric," Walton-on-Thames

METALLIC *makes the job straightforward*

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THE METALLIC SEAMLESS TUBE CO. LTD., LUDGATE HILL, BIRMINGHAM 3. TEL: CEN 7167
Also at London, Newcastle-on-Tyne, Leeds, Swansea and Glasgow

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS · WANTED · FOR SALE · WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia St., W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 35s. per inch, and all other classified advertisements at 2s. 6d. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

CITY AND COUNTY BOROUGH OF BELFAST

Electricity Department

TENDERS are invited for the supply, delivery and erection at the Harbour Power Station of:

Vertical Spindle Centrifugal Type Drainage Pumps, Pipework and Equipment.

Form of tender (No. N.967), in quadruplicate, conditions of contract, specification and drawings may be obtained from Messrs. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-upon-Tyne 1, on payment of a deposit of Five Guineas (cheque to be made payable to the Belfast Corporation Electricity Department), which deposit will be refunded provided a bona-fide tender be lodged and not withdrawn. Extra copies of the contract documents may be obtained at Three Guineas per set, which sum will not be returnable.

Each tender, in quadruplicate, in sealed envelope, marked "Tender for Drainage Pumping Equipment, Harbour Power Station," and endorsed with the name and address of the firm tendering, must reach the undersigned not later than 4 p.m. on Friday, December 8, 1950.

An official receipt must be obtained for each tender delivered by hand. Tenders sent by post should be registered.

The lowest or any tender will not necessarily be accepted.

JOHN DUNLOP,
Town Clerk.

City Hall, Belfast.
October 27, 1950. (G 566)

COUNTY BOROUGH OF STOCKPORT

TO CONTRACTORS

THE General Purposes Committee invites tenders for labour and materials required in : (a) Supply and erection of 200 Lighting Columns (steel or reinforced concrete) and the installation of Lanterns and auxiliary control gear; (b) Supply of 200 Lanterns, Chokes and Capacitors for 400 W horizontal burning mercury vapour discharge lighting.

A firm may tender for both contracts but the Committee reserves the right to accept separate tenders.

Specifications, bills of quantities and forms of tender may be obtained and drawings and general conditions seen on application to the undersigned.

Tenders addressed "The Chairman of the General Purposes Committee, c/o the Borough Surveyor, Town Hall, Stockport" sealed and returned in the envelope provided, to be left at my office, at or before 10 a.m. on Friday, November 24, 1950, and the envelope shall not bear any name or mark indicating the sender.

The Committee do not bind themselves to accept the lowest or any tender.

WM. F. GARDNER, M.I.C.E.,
Borough Surveyor.

Town Hall, Stockport. (G 567)

BOROUGH OF ROMFORD

ENGINEER AND SURVEYOR'S DEPARTMENT

THE Council invite tenders for the electrical installation to 92 two-storey houses on the Masefield Crescent Estate, Romford. The specification and form of tender may be obtained from the Borough Engineer and Surveyor, Town Hall, Romford, on payment of £2 2s., which will be refunded on the receipt of a bona fide tender and all documents.

Sealed tender, endorsed "Electrical Installation (Masefield Part 2)" must be delivered to the undersigned not later than Wednesday, November 22, 1950.

J. TWINN,
Town Clerk.

Town Hall, Romford.
October, 1950. (G 564)

BRIDGEND URBAN DISTRICT COUNCIL

INSTALLATION OF STREET LIGHTING AT EWENNY CROSS ROUNDABOUT ON THE LONDON-FISHGUARD TRUNK ROAD (ROUTE A48)

THE above Council invite tenders for the supply, delivery, erection, wiring and setting in operation of a system of lighting at the above Roundabout by means of 140-W sodium cut-off lanterns on 25-ft. concrete columns.

Details of the installation and plans may be seen at, and specification and form of tender obtained from, D. J. Amos Esq., B.Sc., A.I.M.E., the Engineer and Surveyor to the Council, at the Council Offices, Glan-Ogwr, Bridgend.

Tenders should be delivered to the undersigned in the envelope provided not later than Thursday, November 16, 1950.

H. A. E. GARDNER,
Clerk of the Council.

Council Offices,
Glan-Ogwr, Bridgend.
October 27, 1950. (G 565)

NOTTINGHAMSHIRE COUNTY COUNCIL

Mansfield Technical College

MINING AND ENGINEERING EQUIPMENT

TENDERS are invited for the supply of Mining and Engineering Machinery and Equipment.

Forms of tender and specifications may be obtained from the Divisional Education Officer, Education Office, Mansfield, Notts. Tenders, enclosed in envelopes to be supplied, should be returned to the Clerk of the County Council within 14 days of the appearance of this advertisement.

K. TWEEDALE MEABY,
Clerk of the County Council.

Shire Hall, Nottingham. (G 530)

APPOINTMENTS VACANT

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

South Caledonia Area

ASSISTANT ENGINEER (TECHNICAL)

APPLICATIONS are invited for the position of Assistant Engineer in the South Caledonia Area with headquarters in Perth. The salary and conditions of service will be in accordance with the National Joint Board Schedule, Class "E," Grade 4, £722-£752, or higher salary, depending on qualifications and experience. A suitable house will become available to the successful applicant.

Applicants should have had previous experience in the operation and control of a widespread distribution system, including overhead lines and underground cables, and should be capable of dealing with the technical problems arising on such a system. Candidates must have technical qualifications up to the standard of Corporate Membership of the I.E.E.

Duties will include the supervision of the Substation Construction and Maintenance Department, and candidates must have detailed knowledge and experience of h.v. and l.v. switchgear, protective gear, transformers and other substation plant. The duties will also include the general supervision of the Meter Test Department.

Subject to a medical examination, the successful candidate will require to join the Board's Superannuation Scheme.

Applications should be made, not later than 14 days after the publication of this notice, upon the appropriate form, which may be obtained from the undersigned.

A. GRANT,
Area Manager.

Blackfriars, Perth.
October 1950. (G 581)

NORTH WESTERN ELECTRICITY BOARD

No. 2 Sub-Area

DISTRICT COMMERCIAL ENGINEER'S STAFF

APPLICATIONS are invited for the appointment of FIRST ASSISTANT DISTRICT COMMERCIAL ENGINEER in the Wigan, Leigh and Kearsley Districts of the No. 2 Sub-Area.

The salaries for the posts will be in accordance with the revised National Joint Board Schedule, i.e.,

(a) Wigan District—Class "E," Grade 5 i.e. £662/678/694
(b) Leigh District—Class "F," Grade 5 i.e. £711/724/737
(c) Kearsley District—Class "F," Grade 5 i.e. £711/724/737.

The posts are superannuable.

The duties will include:—

Supply of information and advice to all classes of consumers on electricity utilisation, tariffs, terms, apparatus, wiring schemes and specifications, and on all matters appertaining to electricity service.

Organisation and supervision of industrial and domestic installation work and consumers' maintenance service (including stand-by), and the routine testing and repair of domestic appliances, including the oversight of workshops.

Control of Service Centres, demonstrations, exhibitions and publicity.

Organisation and supervision of consumer records.

Applications, stating age, full details, with relevant dates, of training and experience, qualifications, present post and salary, should be received by E. G. Wardle, A.M.I.E.E., Sub-Area Manager, The North Western Electricity Board, No. 2 Sub-Area, National Buildings, St. Mary's Parsonage, Manchester, 3, not later than Saturday November 18, 1950. (G 538)

LONDON ELECTRICITY BOARD

ENGINEER (TEST)

APPLICATIONS are invited for the above position in the Meter and Testing Branch, Northern Sub-Area, initially to be based at Islington.

Applicants should have had a sound technical education and obtained the Higher National Certificate in Electrical Engineering, or the equivalent, and possess sound practical experience in connection with the testing of protective equipment, high and low voltage switchgear and instruments, cable fault location, general testing work on a high voltage network. A knowledge of the application of electronics is desirable.

Pending grading of the post under the revised agreement of the National Joint Board, the provisional salary will be from £550 per annum, dependent on qualifications and experience.

Application forms from Establishments Officer, 40 New Broad St., E.C.2, obtainable on receipt of addressed foolscap envelope, to be returned duly completed within 7 days. Please quote ref. EST/V/1026/T on envelope and all correspondence. (G 585)

BRITISH ELECTRICITY AUTHORITY

North Western Division

APPLICATIONS are invited for the positions of JUNIOR ENGINEERS to assist Station Shift Control Engineers at the Westwood Generating Station, Wigan, the present capacity of which is 90 MW, but ultimately will be 120 MW.

There are 5 vacancies, and the salaries for the positions, which are superannuable, will be in accordance with Grade 15, Class "F," rising, subject to satisfactory service, to Grade 14, i.e. £375 to £406 per annum, based on the present capacity.

Candidates should preferably possess technical qualifications, and experience in a modern generating station is desirable.

Applications, stating age, present position, and giving full details of education, qualifications and experience, should be received by the Establishment Officer, British Electricity House, Wilmslow Road, East Didsbury, Manchester 20, not later than 7 days after the appearance of this advertisement. (G 553)

BRITISH ELECTRICITY AUTHORITY

North Western Division

APPLICATIONS are invited for STATION SHIFT CONTROL ENGINEERS at the New Agecroft Generating Station, Pendlebury, Lancs. The present capacity of the station is two 52·5 MW sets, and the ultimate capacity will be 210 MW.

The posts are superannuable, and the salaries will be in accordance with Grade 10, Class "G," of the Revised N.J.B. Agreement, i.e. £539 to £561 per annum.

Candidates should preferably possess technical qualifications, and previous experience in a modern generating station is desirable.

This is a repeat advertisement, and persons who applied in August are not required to submit a fresh application.

Applications, stating age, qualifications, present position and giving full details of education and experience, should be received by the Establishment Officer, British Electricity House, Wilmslow Road, East Didsbury, Manchester 20, not later than November 14, 1950. (G 554)

NORTH WESTERN ELECTRICITY BOARD

No. 7 Sub-Area

APPOINTMENT OF FIRST ASSISTANT DISTRICT ENGINEER—STOCKPORT DISTRICT

APPLICATIONS are invited for the appointment of First Assistant District Engineer in the Stockport District of the No. 7 Sub-Area, at a salary in accordance with the revised National Joint Board Schedule, Class "F," Grade 4 i.e. £767-£785-£803 per annum. The post is superannuable.

The engineer appointed will be required to assist the District Engineer in all work in connection with District organisation, which covers construction work on high and low voltage services and extensions, the operation and maintenance of high and low voltage distribution systems within the District, both overhead and underground; the operation and maintenance of sub-station plant, the location of faults in underground cables, and the preparation of estimates and reports in connection with the work required under the District organisation.

Preference will be given to applicants who are Corporate Members or Graduates of the Institution of Electrical Engineers or who hold exempting qualifications.

Applications, stating age, education, qualifications and experience, present position and salary, should be received by J. Harwood Lumsden, M.I.Mech.E., A.M.I.E.E., Manager, No. 7 Sub-Area, The North Western Electricity Board, Chapel Street, Hazel Grove, Stockport, not later than Saturday, November 18, 1950. (G 539)

COUNTY BOROUGH OF BOLTON EDUCATION COMMITTEE

MUNICIPAL TECHNICAL COLLEGE

Principal: J. W. Simpkin, M.Sc.

APPLICATIONS are invited for the appointment of a full-time SENIOR ASSISTANT in the Electrical Engineering Department. Applicants, who should be well qualified to teach electrical engineering subjects to Higher National Certificate standard, should possess a graduate qualification and have had industrial experience. Previous experience of teaching advanced students is desirable.

Salary in accordance with the Burnham Scale for Senior Assistants (£700 by £25 to £800) with the addition of allowances for approved training and degree.

Application forms and further particulars may be had from the undersigned to whom completed applications should be sent as soon as possible.

W. H. HAYWARD,
Chief Education Officer.

Education Offices,
Nelson Square, Bolton. (G 560)

NORTH EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the appointment of SENIOR ASSISTANT in the Publicity Sub-Section of the Chief Commercial Officer's Department, Carliol House, Newcastle-upon-Tyne 1.

Conditions of service will be in accordance with the National Joint Council (Administrative and Clerical Grades) for the Electricity Supply Industry.

The appointment will be within Grade 6 of the N.J.C. Salary Agreement, viz. £630 x £25 to £705 per annum, and the selected applicant will be required to enter the British Electricity Authority and Area Board's Superannuation Scheme.

Applicants should have the ability to initiate and execute high-class display schemes in Service Centres throughout the Board's area, and to instruct existing staffs in display technique.

Applications, stating age, qualifications and experience, should be forwarded within fourteen days to the Secretary (Establishments), The North Eastern Electricity Board, Carliol House, Newcastle-on-Tyne 1. (G 555)

NORTH WESTERN ELECTRICITY BOARD

No. 3 Sub-Area

APPOINTMENT OF THIRD ASSISTANT ENGINEER (OPERATION AND MAINTENANCE)

APPLICATIONS are invited for the appointment of Third Assistant Engineer (Operation and Maintenance) on the engineering staff at the No. 3 Sub-Area Headquarters, Union Street, Oldham.

The salary for the post will be in accordance with Class "J" Grade 10, of the revised National Joint Board Agreement, i.e. £609 £621 £633 per annum.

Applicants should have had a wide experience in the operation and maintenance of large industrial and rural high voltage and low voltage networks, including both overhead lines and underground cables of voltages up to and including 33 kV; also experience in high voltage testing and fault localising. Graduate membership of the Institution of Electrical Engineers or exempting qualifications will be an advantage.

Applications stating age, education, qualifications and experience, present post and salary, should be received by E. Binns, M.I.Mech.E., A.M.I.E.E., Sub-Area Manager, The North Western Electricity Board, No. 3 Sub-Area Headquarters, Union Street, Oldham, not later than Saturday, November 18, 1950. (G 540)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

APPLICATIONS are invited for the appointment of CIVIL ENGINEERING ASSISTANT in the Generation Construction Department at Divisional Headquarters at a salary in accordance with the Revised National Joint Board Agreement, Class "AX.CX", Grade 5 (£579 to £753 per annum.)

Applicants should have received a regular engineering training and should preferably have passed Sections A and B of the examination for Associate Membership of the Institution of Civil Engineers or possess equivalent qualifications.

Applicants should be capable of carrying out land surveys and be competent draughtsmen. They should have had some experience of reinforced concrete design and a sound knowledge of general building construction is desirable.

The appointment is superannuable under the British Electricity Authority and Area Boards' Scheme.

Forms of application may be obtained from the Divisional Secretary at the address below, to whom completed applications should be returned not later than November 14, 1950, in sealed envelope endorsed "Civil Engineering Assistant."

H. V. PUGH,
Divisional Controller.

Cardiff (Pengam Moors) Airport,
Cardiff.
October 25, 1950. (G 562)

EASTERN ELECTRICITY BOARD

Chilterns Sub-Area, Luton District

ASSISTANT COMMERCIAL ENGINEER
(INDUSTRIAL POWER)

APPLICATIONS are invited for the above appointment, the selected candidate being required to advise important industrial consumers on matters relating to tariffs, installation of industrial electrical equipment, factory lighting, power factor improvement, etc.

Preference will be given to those having the Higher National Certificate in electrical engineering, of good personality and appearance, and having considerable experience of industrial installations, including preparation of estimates for work involved.

Ability to drive a car is desirable.

The salary offered will be in accordance with the National Joint Board Agreement Class "G", Grade 9, £571 to £587 per annum. The selected candidate will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications stating age, education, technical qualifications and experience should be submitted in writing to The District Manager, Luton District, Chilterns Sub-Area, Eastern Electricity Board, 487 Dunstable Road, Luton, Beds, to arrive not later than 14 days from the appearance of this advertisement. (G 561)

YORKSHIRE ELECTRICITY BOARD

No. 4 (Leeds) Sub-Area

APPLICATIONS are invited for the following appointment:—

SERVICE CENTRE SUPERVISOR
(LEEDS DISTRICT)
(Vacancy No. 73/50)

Applicants must have considerable knowledge and experience of Service Centre and Development work, including sale of electrical appliances, hire purchase negotiations, advising consumers on matters relating to the use of electricity, and organising lectures and demonstrations.

A knowledge of space and water heating is essential and experience in radio and television an advantage.

Salary: N.J.C. Grade 5, £570 by £20 to £630 per annum.

Applications, stating the above vacancy number, and giving full details of age, qualifications, and experience, should be forwarded to the Manager, No. 4 (Leeds) Sub-Area, Yorkshire Electricity Board, 1 Whitehall Road, Leeds, within 14 days of the appearance of this advertisement. (G 586)

UNIVERSITY OF LIVERPOOL

APPLICATIONS are invited for two ASSISTANT LECTURESHIPS in the Department of Electrical Engineering (Electro-technics) at an initial salary of £450 per annum, with allowance for age and qualifications. Experience in the generation, transmission and distribution of electrical energy, design of electrical machinery, electric traction and advanced electrical technology would be advantageous.

Applications, stating age, academic qualifications and experience, together with the names of three referees, should be received not later than November 20, 1950, by the undersigned, from whom further particulars of the conditions of the appointments may be obtained.

STANLEY DUMBELL,
Registrar.

October 17, 1950. (G 485)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

TEMPORARY SENIOR CLERK OF WORKS

APPLICATIONS are invited for the appointment of Senior Clerk of Works at the Uskmouth Generating Station now in course of erection near Newport, Monmouth.

The salary will be in accordance with the National Joint Council (Administrative and Clerical Grades) Agreement, Grade 6 (£630 to £705 per annum).

Consideration will be given to the payment of a subsistence allowance to the successful candidate if the appointment entails his living away from home.

Applicants should have had a sound experience on large civil engineering works involving heavy foundation and superstructure work, pile driving, and the erection of structural steel buildings.

The appointment will be superannuable under the British Electricity Authority and Area Boards' Scheme.

Forms of application may be obtained from the Divisional Secretary at the address below to whom completed applications should be returned not later than November 20, 1950, in sealed envelope endorsed "Senior Clerk of Works".

H. V. PUGH,
Divisional Controller.

Cardiff (Pengam Moors) Airport,
Cardiff.
October 24, 1950. (G 563)

BRITISH ELECTRICITY AUTHORITY

North Western Division

APPLICATIONS are invited for the following positions: Vacancy No's. as below;—

307 BOILER HOUSE SUPERINTENDENT, Kearsley Generating Station. Salary range: N.J.B. Schedule A, Grade 6, Class "K", i.e. £851 to £891 per annum.

308 ASSISTANT SHIFT CHARGE ENGINEER, Kearsley Generating Station. Salary range: N.J.B. Schedule A, Grade 9, Class "K", i.e. £687 to £715 per annum.

309 SHIFT CHARGE ENGINEER, Radcliffe Generating Station. Salary range: N.J.B. Schedule A, Grade 7, Class "F", i.e. £625 to £643 per annum.

310 SHIFT CHARGE ENGINEER, Agecroft (L.P.) Generating Station. Salary range: N.J.B. Schedule A, Grade 7, Class "F", i.e. £625 to £643 per annum.

311 STATION SHIFT CONTROL ENGINEER, Radcliffe Generating Station. Salary range: N.J.B. Schedule A, Grade 10, Class "F", i.e. £510 to £530 per annum.

Candidates should preferably have had experience in a large modern generating station, and possession of technical qualifications is desirable.

Applications, quoting the vacancy number, should give details of education, training, experience, and present position, and be received by the Establishment Officer, British Electricity House, Wilmslow Road, East Didsbury, Manchester 20, not later than November 11, 1950. (G 541)

NORTH WESTERN ELECTRICITY BOARD

APPOINTMENT OF PRINCIPAL ASSISTANT, ESTABLISHMENT SECTION, SECRETARY'S DEPARTMENT, AREA BOARD HEADQUARTERS

APPLICATIONS are invited for the appointment of Principal Assistant to the Establishment Officer, Secretary's Department, at the Headquarters of the North Western Electricity Board, Cheetwood Road, Manchester 8, at a salary in accordance with Grade 9 of the National Joint Council Salary Agreement, i.e. £600 by £20 to £1,020 per annum. The post is superannuable.

Applicants should have had wide experience in a senior appointment in an establishment section of a large organisation, preferably in the electricity supply industry.

Applications, stating age, qualifications, experience, present position and salary, should be received by the Establishment Officer, the North Western Electricity Board, Cheetwood Road, Manchester 8, not later than Saturday, November 11, 1950. (G 584)

NORTH EASTERN ELECTRICITY BOARD

Tyne Sub-Area

APPLICATIONS are invited for the post of HOUSECRAFT ADVISER at Carliol House, Newcastle-upon-Tyne. The duties include organising public demonstrations, taking charge of the demonstration kitchen, and advising customers on all classes of domestic apparatus.

Applicants should hold the certificate of a recognised domestic science college, the E.A.W. Housecraft Diploma, and have had practical experience.

Salary and conditions will be in accordance with Grade 2 (£390 to £450 a year) of the National Joint Council Agreement for the electricity supply industry.

Applications, stating age, education, training and experience should be sent to the Manager, Tyne Sub-Area, The North Eastern Electricity Board, Osborne House, 80 Jesmond Road, Newcastle-upon-Tyne 2. (G 582)

TRINIDAD AND TOBAGO ELECTRICITY COMMISSION

RESIDENT ENGINEER

APPLICATIONS are invited for the appointment of Resident Engineer to the Trinidad and Tobago Electricity Commission.

The Commission has under construction a new power station at Penal, consisting initially of two 5,000 kVa turbo-alternator sets with two water-tube boilers and ancillary equipment, which will be interconnected through a 66 kV transmission line with the Port of Spain power station of 19,900 kVa capacity. A diesel engine power station is to be constructed on the island of Tobago.

The Engineer appointed will be responsible for the supervision of construction of the complete power station plant and buildings, including water-tube boilers, turbo-alternators, pipework, switchgear and auxiliary equipment, together with machine and building foundations and superstructure.

Applicants must be not more than 40 years of age and be fully qualified engineers with considerable experience in the work outlined above.

The salary of the appointment is in the scale $6,480-$240-$6,960 per annum (£1=$4.80 B.W.I.) equivalent to £1,350-£50-£1,450 p.a., subject to satisfactory service.

Furnished quarters at moderate rentals or a rent allowance in lieu are provided under the Commission's regulations.

Free passages are provided for the officer and family not exceeding four persons.

An outfit allowance of $288 (£60) will be granted on first appointment.

The appointment is subject to an agreement for a period of three years and medical examination by the Commission's medical adviser.

Applications, endorsed "Resident Engineer, Trinidad," stating age, marital status, family, nationality, general and technical education, qualifications and experience, and full particulars of appointments held, with references, to be submitted to the undersigned within 21 days from the date of this advertisement.—Preece, Cardew and Rider, 8 and 10 Queen Anne's Gate, Westminster, S.W.1. (G 556)

SOUTH EASTERN ELECTRICITY BOARD

ASSISTANT DISTRICT COMMERCIAL ENGINEER

Worthing

SALARY of £519 to £531 p.a. under the N.J.B. Agreement, Class "E", Grade 4. Superannuation will be arranged. Applicants must be capable of preparing specifications and estimates, dealing with correspondence and consumers' queries, and must have a thorough knowledge of the Electricity Supply Regulations and the I.E.E. Regulations for the Electrical Equipment of Buildings, and of Domestic Apparatus Maintenance and Repairs in the workshop and in Consumers' premises.

Applications, giving two referees, must reach M. J. Mortimer, Esq., M.I.E.E., Worthing Manager, South Eastern Electricity Board, Electric House, Chapel Road, Worthing, within 10 days from today.

DISTRICT DISTRIBUTION ENGINEER

Purley District

Salary of £775 p.a., rising to £809 p.a., plus London Weighting under the N.J.B. Schedule, Class "E", Grade 3. Superannuation will be arranged. Applicants to be Corporate Members of the I.E.E. or hold equivalent qualifications and have a sound technical education, engineering training and administrative experience. Experience in planning, construction, and maintenance of public lighting systems is essential. The appointed person will be responsible to the District Manager for the administration of the Distribution Department and the planning, construction, maintenance and operation of the district distribution system. This is mainly underground at 11 kV, 2 kV and medium voltage.

Applications, giving two referees, must reach J. McAlister, Esq., B.Sc., A.M.I.E.E., Purley Manager, South Eastern Electricity Board, Electric House, High Street, Purley, within 10 days from today.

A. L. BURNELL,
Secretary.

October, 1950. (G 587)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

APPLICATIONS are invited for the position of FOREMAN MECHANICAL FITTER (Turbines and Workshop) at Kingston "B" Power Station.

Applicants should have served a recognised apprenticeship as a Fitter, and should have had at least five years experience in high grade fitting work, preferably on repair and maintenance of large generating station plant.

Conditions of service and rate of pay will be in accordance with the N.J.I.C. Agreement—3s. 7d. per hour, or £7 17s. 8d. for a 44-hour week.

Letters of application, stating age, qualifications and experience, should be posted to the Station Superintendent, Kingston "B" Power Station, Down Hall Road, Kingston-on-Thames, Surrey, to arrive not later than November 14, 1950. (G 537)

SOUTH WESTERN ELECTRICITY BOARD

APPLICATIONS are invited from suitably qualified and experienced persons for the following positions on the Engineering Staff in the Bristol Sub Area:—

(a) Bristol Sub-Area Headquarters
(Offices at Bristol)

(1) THIRD ASSISTANT ENGINEER (CONSTRUCTION)
Commencing salary £609 p.a. (Class "J", Grade 10, N.J.B. Schedule).

The duties attached to this post include responsibility for all types of construction work including u.g. cables and o.h. lines, switchgear and buildings; phasing of work and supply of materials; preparing specifications, reports and statistics and maintaining progress records. Candidates should have had wide experience in these duties and be able to exercise supervision.

(2) THIRD ASSISTANT ENGINEER (PLANNING)
Commencing salary £609 p.a. (Class "J", Grade 10, N.J.B. Schedule).

The successful candidate will be required to assist in the planning and initiation of all new works and extentions, the design of o.h. lines, and preparation of capital sanction applications, specifications, reports and statistics.

(b) Bristol District (Offices at Bristol)

ARCHITECTURAL DRAUGHTSMAN

At a provisional commencing salary between £400 and £475 p.a. (which may be subject to adjustment when national scales are negotiated).

Candidates should have extensive knowledge of industrial building construction and be capable of surveying and taking levels on substation and other sites. It is desirable that they should have had at least three years' experience in a constructional drawing office.

(c) Bath District (Offices at Bath)

SECOND ASSISTANT DISTRICT ENGINEER
(CONSTRUCTION)
Commencing salary £579 p.a. (Class "E", Grade 7, N.J.B. Schedule).

The successful candidate will be responsible for all construction work in the district of a nature similar to that outlined in (a) (1) above.

(d) Weston District (Offices at Weston)

(1) SECOND ASSISTANT DISTRICT ENGINEER
(OPERATION AND MAINTENANCE)
Commencing salary £579 p.a. (Class "E", Grade 7, N.J.B. Schedule).

Applicants should be thoroughly familiar with the operation and maintenance of Urban and Rural supply networks up to 11 kV u.g. and 33 kV o.h., including substation equipment, protective gear and fault location. They should also be conversant with safety regulations and be accustomed to the control of men.

(2) THIRD ASSISTANT DISTRICT ENGINEER
(CONSTRUCTION)
Commencing salary £519 p.a. (Class "E", Grade 9, N.J.B. Schedule).

Candidates should have had experience in o.h. line planning and construction, including the scheduling and requisitioning of materials, preparation of notices and plans, and control of labour in the field.

For all these posts, possession of appropriate technical qualifications will be an advantage.

The persons appointed (with the exception of the Architectural Draughtsman) may be required to participate in a rota for stand-by duty, when necessary.

Applications, stating present position and salary, qualifications and experience and indicating for which post(s) candidates wish to be considered should reach the Sub Area Manager, Bristol Sub Area, South Western Electricity Board, Electricity House, Colston Avenue, Bristol 1, within 10 days. (G 589)

CITY OF MANCHESTER

City Architect's Department

APPLICATIONS are invited for the permanent appointment of an ELECTRICAL ENGINEERING ASSISTANT.

Candidates must be capable of preparing schemes for electric lighting and power installations in all types of municipal buildings, and have passed the intermediate or equivalent examination of the Institute of Electrical Engineers.

The salary and conditions of service will be in accordance with A.P.T. Grade III of the National Scheme of Service Conditions, i.e., £490 to £595 per annum.

Forms of application may be obtained from, and should be returned, together with not more than three recent testimonials, to Leonard C. Howitt, B.Arch., F.R.I.B.A., City Architect, Town Hall, Manchester 2, by November 18, 1950, endorsed "Electrical Engineering Assistant." Canvassing is prohibited.

PHILIP B. DINGLE,
Town Clerk.

Town Hall, Manchester.
November, 1950. (G 583)

SOUTH WESTERN ELECTRICITY BOARD

APPLICATIONS are invited from suitably qualified and experienced persons for the following positions in the Board's Central Construction Department with headquarters at Taunton:—

(a) CONSTRUCTIONAL ENGINEERING DRAUGHTSMAN
Commencing provisional salary within range £425 to £475 p.a.
Candidates should have had experience in the design of reinforced concrete beams, slabs and foundations; simple steel lattice structures, beams, etc., and in general building work.

(b) SURVEYOR
Commencing provisional salary within range £425 to £475 p.a.
Candidates should have had at least four years' experience in practical surveying (employing a theodolite and dumpy level), preferably on overhead line work in the electrical industry.
For both these posts, suitable technical qualifications will be an advantage.
In both cases, the salaries indicated are provisional and liable to adjustment when final salary scales are determined by the appropriate negotiating body.
The appointed centre for the successful candidates will be at Taunton, but they will be required to travel extensively throughout the Board's area, in respect of which travelling and subsistence allowances, according to scale, will be payable.
Applications, stating age, present appointment and salary, qualifications and experience, and indicating for which post candidates wish to be considered, should be sent to the Assistant Secretary (Establishments), South Western Electricity Board, Electricity House, Colston Avenue, Bristol 1, within 10 days. (G 588)

SOUTHERN ELECTRICITY BOARD

No. 3 (Portsmouth) Sub-Area

APPLICATIONS are invited for the following appointments:—

PORTSMOUTH SUB-AREA

Post.—FIELD ENGINEER, Construction Department (based at Farnborough, Hants). Qualifications.—Ability to supervise erection of 33-kV and 11-kV and l.v. overhead lines, laying and jointing of h.v. and l.v. cables and equipment of 33-11 kV substations.
Salary and conditions.—Provisional salary of £458 per annum, subject to adjustment by the appropriate negotiating machinery with N.J.B. conditions of service.

ALDERSHOT DISTRICT

Post.—ASSISTANT DISTRICT COMMERCIAL OFFICER (First Assistant). Qualifications.—Sound knowledge of rural development and a comprehensive knowledge of estimating for all types of electrical installations. Applicants must be fully conversant with all aspects of the commercial side of the Electricity Supply Industry.
Salary and conditions.—Salary in accordance with N.J.B. Agreement, Class "F," Grade 6 (£660-£676-£692), with N.J.B. conditions of service.
The successful candidates for the above vacancies will, if eligible, be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme.
Applications, on forms to be obtained from the Sub-Area Secretary, Lower Drayton Lane, Cosham, Portsmouth, should be returned to him in envelopes endorsed with the title of the post, not later than 14 days after the appearance of this notice.

F. W. KEMPTON,
Secretary.
(G 580)

ABERDARE CABLES LTD., Aberdare, Glam., require two ESTIMATORS experienced in handling overseas enquiries for paper cables. Full particulars and salary required. (G 579)

APPLICATIONS are invited for a number of vacancies for ELECTRICAL ENGINEERING SENIOR DRAUGHTSMEN for the installation of electrical equipment in large civil and military aircraft. Some knowledge of electronic equipment is desirable and possession of O.N.C. or H.N.C. (Elect.) preferable. The vacancies are for Cricklewood and Radlett (Herts.) drawing offices. Further vacancies exist at Cricklewood only for Junior Electrical Engineering Draughtsmen for detailing the above work. Applications from trainees wishing to take up a career in aircraft electrical installation work will be considered. The positions offer excellent opportunities for advancement to keen men. Write, stating age, and full details of experience and qualifications, to: Staff Officer, Handley Page, Ltd., Cricklewood, London N.W.2. (G 260)

APPLICATIONS are invited by the English Electric Co., Ltd., Stafford, from young ENGINEERS of graduate or Higher National Certificate standard, with experience in the preparation of control gear wiring diagrams, for training as control gear engineers on specialised schemes. Selected applicants will, where necessary, be given a short course of training and will receive full pay during this period. The positions are permanent and progressive and afford excellent opportunities.—Apply, quoting Reference 805, to Central Personnel Services, English Electric Co., Ltd., 24-30 Gillingham Street, London S.W.1. (G 335)

CONTROL ENGINEERS

CONTROL ENGINEERS for network operation required by Major Oil Company in Middle East for control centre covering operation of extensive overhead and underground transmission and distribution networks up to 66 kV. Applicants must possess Ordinary or Higher National Certificate in Electrical Engineering, and must be experienced in the operation of indoor and outdoor metal-clad switchgear at all voltages, transformers and associated substation equipment. Age not over 35. Attractive salary, plus generous allowance in local currency, free passages out and home, free medical attention, kit allowance, good leave arrangements. Pension Scheme.—Write, giving personal particulars and details of qualifications and experience, quoting:
DEPARTMENT F.116 TO BOX NO. 2581 AT 191 GRESHAM HOUSE, E.C.2. (E 389p)

APPLICATIONS are invited by the English Electric Co., Ltd., for ENGINEERS having wide experience in the preparation of comprehensive and specialised schemes of machine control. Applicants must be of Higher National Certificate standard and capable of preparing schemes in detail.—Apply, quoting Reference 806, to Central Personnel Services, English Electric Co., Ltd., 24-30 Gillingham Street London S.W.1. (G 334)

APPLICATIONS are invited from ENGINEERS with experience of the erection of heavy electrical equipment, for supervisory positions overseas. In the first instance periods of service are likely to be of three years' duration. Attractive terms and conditions of employment which will be fully explained at interview. Apply, quoting Ref. 811, to Central Personnel Services, English Electric Co., Ltd., 24-30 Gillingham Street, London S.W.1. (G 465)

ASSISTANT DESIGNER required by an established firm of industrial motor manufacturers. Applicants having design experience of a.c. and d.c. motors, generators and alternators, covering outputs up to approx. 200 h.p., should reply stating age, experience, qualifications and salary expected to: Box No. 1827, Electrical Times. (G 488)

CABLE JOINTERS for work on 33 kV installations required immediately. Must be prepared to work in any part of the U.K. Apply, stating age and giving details of experience to Box No. 1843, Electrical Times. (G 532)

CAPABLE ENGINEER to handle development and sales of device associated with motor control gear. Experience of traction and industrial motor control gear design essential. Age 30-35. Salary £700 per annum.—Full particulars to Box No. 1863, Electrical Times. (G 568)

CHIEF ASSISTANT TRANSMISSION ENGINEER: experienced in design and construction of overhead lines, required by large electrical contractor. Good prospects and superannuation. Write, giving full details and salary required, to Box No. 1847, Electrical Times. (G 534)

CHIEF DRAUGHTSMAN wanted. Large electrical manufacturing company in the Midlands invite applications for the position of Mechanical Engineer and Chief Draughtsman for their meter and instrument factory. Apply, quoting reference AED to Box No. 1857, Electrical Times. (G 557)

COOKE AND FERGUSON, LTD., Manchester, require a SECTION LEADER in the Designs Drawing Office. Applicants must have experience of switchgear layout and design work, and must be capable of accepting responsibility under general supervision only.—Reply, stating age, qualifications, experience, and salary required, to the Personnel Manager, Victoria Street, Openshaw Manchester 11. (G 438)

DRAUGHTSMEN (ELECTRICAL) with experience of Schematic or Detail Wiring Diagrams, are invited to apply for progressive positions in the Drawing Offices of the English Electric Co., Ltd., Liverpool.—Write, giving full particulars, quoting Ref. 140, to Central Personnel Services, English Electric Co., Ltd., 24-30 Gillingham Street, London S.W.1. (G 492)

DRAUGHTSMEN required. Preference will be given to men with experience in Design and Detailing of Electro-Mechanical Mechanisms and Welding Fabrications. Starting salary commensurate with experience; location North-West England. Excellent opportunities for advancement.—Write, giving full details, quoting Ref. ACE, to Box No. 1833, Electrical Times. (G 491)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

DRAUGHTSMAN (ELECTRICAL) required for Iron and Steel Works. Applications, giving age, details of education and experience, with dates, should be submitted, together with salary required, to the Chief Engineer, Workington Iron and Steel Company, Moss Bay, Workington. (G 549)

ELECTRICAL DESIGNER DRAUGHTSMEN required, experienced in industrial power distribution, substation layouts and conduit lighting and power schemes. Several men required, good working conditions, pension scheme operating. Apply by letter stating exmerience and salary required to the Chief Draughtsman, The Lummus Co. Ltd., Imperial House, 80 Regent Street, London, W.1. (G 552)

ELECTRICAL DRAUGHTSMAN required by major oil company for service in the Middle East. Must have served five years electrical engineering apprenticeship, and have had five years D.O. experience in connection with electrical layouts of large industrial plants with underground cable networks. Should possess Higher National Certificate. Graduate or associate membership of a corporate engineering body desirable but not essential. Maximum age limit 35 years. Attractive salary plus generous allowance in local currency. Free passages out and home, free medical attention, kit allowance, good leave arrangements. Pension scheme.—Write, giving personal particulars and details of qualifications and experience, quoting Dept. F.192, to Box No. 2909, at 191 Gresham House, Old Broad Street, E.C.2. Applicants without above requirements will not be considered. (F 322)

ELECTRICAL ENGINEER wanted with lift experience: good wages and bonus.—Apply: Marryat and Scott Ltd., Hounslow, Middlesex. (G 494)

ELECTRICAL ENGINEERS, age 25-35 H.N.C., required in Design Office of company in Bcreham Wood, Herts, manufacturing selenium metal rectifying equipment. —Write, stating age, qualifications and experience to Box No. 1819, Electrical Times. (G 471)

ELECTRICAL ENGINEERS required for service in Middle East. Applicants should (a) possess Ordinary or Higher National Certificate and have had full apprenticeship with heavy electrical equipment manufacturers or with a large colliery or allied fully electrified industry, or (b) possess a degree and have had two years' technical apprenticeship with similar firm to above. In each case applicants must have had at least three years' subsequent experience on the installation and maintenance of heavy electrical equipment. Maximum age limit 35 years. Attractive salary, plus generous allowance in local currency, free passages out and home, free medical attention, kit allowance, good leave arrangements. Pension scheme.—Write, giving particulars and details of qualifications and experience, quoting Dept. F.191, to Box No. 2916 at 191 Gresham House, E.C.2. (G 19)

ELECTRICAL ENGINEER required to take charge of installation and maintenance of sub-station and electrical plant for a large industrial concern in South Wales. Applicants must have had extensive practical experience on installation and commissioning modern 11 kV switchgear and protective systems, 3·3 kV and 440 V motor and control gear, also turbo generating plant. Applicants should be Chartered Electrical Engineers.—Apply to Box No. 1869, Electrical Times. (G 571)

ELECTRICAL STOREKEEPER required for shopfitters: Full particulars to E. Pollard and Co. Ltd., 159 St. John Street, Clerkenwell, E.C.1. (G 557)

ENGINEER required for development and design of power capacitors, experience in this field desirable but not essential. Salary according to qualifications and experience.—Write, stating age, qualifications and salary requirements to Box No. 1867, Electrical Times. (G 570)

ENGINEERING DRAUGHTSMAN, under thirty years, Nr. Wimbledon. Workshop experience and electrical knowledge essential. Write, stating age, experience and salary required to Box No. 1849, Electrical Times. (G 535)

ESTIMATOR. Experienced Estimator for Westminster office to deal with a.c. and d.c. enquiries. State age, qualifications, experience and salary required.—Write to F.H.S. Lancashire Dynamo & Crypto Ltd. 94 Petty France, Westminster, S.W.1. (G 469)

K. L.G. Sparking Plugs Ltd., require a TECHNICAL ASSISTANT with National Certificate or equivalent qualifications for their Engineering Department for development work and providing technical assistance to factory production in connection with thermocouples and temperature measurements generally. Some experience in electrical measurements desirable.—Apply, giving details of qualifications and experience to Commercial Manager, Putney Vale, S.W.15. (G 590)

PILKINGTON BROTHERS LIMITED, Glass Manufacturers, require an ASSISTANT ELECTRICAL ENGINEER (not over 30 years of age) for the installation and maintenance of a large electrical plant in the North of England. Applicants should possess a University Degree in Electrical Engineering, should be a Graduate of the Institution of Electrical Engineers, and should have at least 2 years' practical experience. Salary according to age and qualifications.—Applications should be addressed to the Chief Personnel Officer, Pilkington Brothers Limited, St. Helens, Lancashire. (G 591)

LARGE electrical manufacturer has opening for a fully qualified ELECTRICAL ENGINEER with sales experience for the sale of industrial rectifiers, capacitors and electronic motor control equipment. Candidates should hold Higher National or equivalent. Excellent prospects for advancement to engineer with flair for the selling of technical articles. State education, training, experience and qualifications, and if possible send photograph, which will be returned, to Box No. 1861, Electrical Times. (G 559)

LIGHTING REPRESENTATIVE required for London area. Successful applicant must possess sales ability to enable him to interest potential customers in large fluorescent installations. Must also have thorough technical knowledge so that he can initiate lighting schemes and discuss them in detail with lighting consultants, architects, etc. Write, giving full particulars, Box No. AC 56826, Samson Clarks, 57-61 Mortimer Street, W.1. (G 542)

PRODUCTION EXECUTIVE. A large, old established Electrical Engineering Firm requires a Top Production Executive, aged 35 to 45, as Works Manager of their London Factory. Must be capable of controlling Personnel and have a thorough knowledge of machine tooling, layout, planning, small batch production and, preferably, large Power Transformer manufacture. The post necessitates a sound engineering training, experience in labour management and the applicant should have held a responsible executive position in a plant of some magnitude. The question of salary is regarded by the Company as an important ancillary to the attracting of the right man, and a figure of £2,000 a year may be taken as a guide. Housing assistance will be given, if necessary, and the Company operates a superannuation scheme. Applications will be treated as strictly confidential and should be addressed to the Managing Director, Box No. 1851, Electrical Times. (G 536)

SALES. ASSISTANT TO MANAGER required by a firm of non-associated cable manufacturers, situated within 20 miles of London (south).—Reply, Box No. 1865, Electrical Times. (G 569)

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STRUCTURAL DESIGNERS AND DESIGNER-DRAUGHTSMEN with experience in light steel structures required for work in London office in connection with radio masts and towers.—Apply, stating age, qualifications, experience and salary required to the Staff Officer, British Insulated Callender's Construction Company, Limited, 21 Bloomsbury Street, London, W.C.1. (G 375)

SWITCHGEAR DESIGNER, with up-to-date experience of 11 kV gear.—Apply, New Switchgear Construction Co. Ltd., Sutton, Surrey. (G 574)

TRANSFORMER DRAUGHTSMEN with experience on units up to about 10 MVA and preferably, with some knowledge of on-load tap-changing gear.—Apply Technical Director, Bryce Electric Construction Co., Ltd., Kelvin Works, Hackbridge, Surrey. (G 503)

WANTED. Young ELECTRICAL ENGINEER, 24-30 years. Full apprenticeship and Grad. I.E.E. essential. Must be a reasonably good draughtsman. Good prospects for a young man with drive and initiative.—Full details to Box No. 1871, Electrical Times. (G 572)

WELL-KNOWN electrical accessory manufacturers require REPRESENTATIVE for Scotland, Northern Ireland and Newcastle territory. Applicants must have established connection amongst electrical wholesalers, contractors, public supply authorities and B.E.A. Car owner essential. Write giving full particulars of experience, qualifications, and salary expected, to Box No. 1845, Electrical Times. (G 533)

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BUYER, M.P.O.A., aged 28, providing positive and economic results, exp. foundry, sheet metal, vitreous enamel and light elect. eng., seeks progressive appointment.—Box No. 1781, Electrical Times. (G 318)

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INDEX TO ADVERTISERS

Aerialite, Ltd. 26
Austin Taylor Electrical Ltd. ... 34
Automatic Telephone and Electric Co., Ltd. ... 23
Babcock and Wilcox, Ltd. ... 28
Barries Electrical Agencies, Ltd. 24
Belling and Co., Ltd. ... 6
Bill Switchgear, Ltd. ... 5
Booth, James and Co., Ltd. ... 62
Bowker, S. O., Ltd. ... 14
Bray, George and Co., Ltd. ... 60
Brentford Transformers, Ltd. ... 8
British Electrical Repairs, Ltd. 76
British Insulated Callender's Cables, Ltd. ... 18
British National Electrics, Ltd. ... 35
British Thomson-Houston Co., Ltd. 42
Brush Electrical Engineering Co., Ltd. ... 11
Bryce Electric Construction Co., Ltd. ... 12
Burn, George, Ltd. ... 72
Carter, B. and F. Co., Ltd. ... 74
Cole, E. K., Ltd. ... 66
Columbus, Ltd. ... 61
Commercial Electric Co., Ltd. ... 56
Connolly's (Blackley) Ltd. ... 30
Cressall Manufacturing Co., Ltd. 4
Crompton Parkinson, Ltd. ... 37
Daleman, Richard, Ltd. ... 74
Desoutter Bros., Ltd. ... 13
Drake and Gorham Wholesale, Ltd. 66
Drubel Distributors, Ltd. ... 12
Drummond, John (Engineers) Ltd. 72
Edison Swan Electric Co., Ltd. ... 2
Ega Electric, Ltd. 32
Ekco Ensign Electric, Ltd. ... 63
Electric Construction Co., Ltd. ... 65
Electrical Contractors Assoc. ... 53
Electrical Times 70
Ellison, George, Ltd. 40
E.M.I. Institutes 74
English Electric Co., Ltd. ... 3
Ferranti, Ltd. 16
Flexible Non-Metallic Conduits, Ltd. 58
Fluxite, Ltd. 66
Funditor, Ltd. 74
General Cable Manufacturing Co. Ltd. 39
General Electric Co., Ltd. 15, 25, 59
Glover, W. T. and Co., Ltd. ... 57
Grimmer, W. H. 53
Hackbridge and Hewittic Electric Co., Ltd. 43
Hardy and Padmore, Ltd. ... 62
Heayberd, F. C. and Co., Ltd. ... 68
Henley's W. T. Telegraph Works Co., Ltd. 1
Heyes and Co., Ltd. 30
Hick, Hargreaves and Co., Ltd. ... 78
Inductive Appliances, Ltd. ... 60
Johnson and Phillips, Ltd. ... 29
Kempston Electrical Co., Ltd. ... 70
Marbourn, Ltd. 58
McGeoch, Wm. and Co., Ltd. ... 4
McKechnie Bros., Ltd. 20
Measuring Instruments (Pullin) Ltd. 22
Mersey Cable Works, Ltd. ... 33
Metallic Seamless Tube Co., Ltd. 44
Metropolitan Electric Cable and Construction Co., Ltd. ... 73
Metropolitan-Vickers Electrical Co., Ltd. 21, 67
M.K. Electric, Ltd. 27
Motor Rag Co., Ltd. 72
National Corrugated Paper Co., Ltd. 7
Nettle Accessories, Ltd. ... 78
Parnall (Yate) Ltd. 77
Permaheat, Ltd. 64
Philips Electrical Ltd. 9
Pratt, A. J. and Sons, Ltd. ... 58
Premier Electric Heaters, Ltd. ... 55
Pressed Steel Co. Ltd. 54
Revo Electric Co., Ltd. 75
Reyrolle, A. and Co., Ltd. ... 71
Rheostatic Co., Ltd. 10
Rowlands Electrical Accessories, Ltd. 17
Sanders, Wm. and Co. (Wednesbury) Ltd. 20
Shell Mex and B.P., Ltd. 36
Siemens Electric Lamps and Supplies, Ltd. 69
Siemens-Schuckert (Great Britain) Ltd. 32
Simmonds and Stokes, Ltd. ... 64
Simplex Electric Co., Ltd. ... 31
Smith, Herman, Ltd. 4
Sperryn and Co. 70
Stainless Steel Wire Co., Ltd. ... 24
Statter, J. G. and Co., Ltd. ... 72
Symonds, R. H., Ltd. 14
Taylor Electrical Instruments, Ltd. 38
Thorn Electrical Industries, Ltd. 19
V.G. Manufacturing Co., Ltd. ... 38
Wades (Metal Spinners) Ltd. ... 70
Walter, D. and Co., Ltd. ... 20
Walton's Wireless Stores ... 53
Weir, G. and J., Ltd. 34
Westool, Ltd. 24
Wilcox, Edward and Co., Ltd. ... 68
Wildbore, J. E. Ltd. 54
Wireohms Ltd. 53
Yarrow and Co., Ltd. ... 56
Zenith Electric Co., Ltd. ... 22

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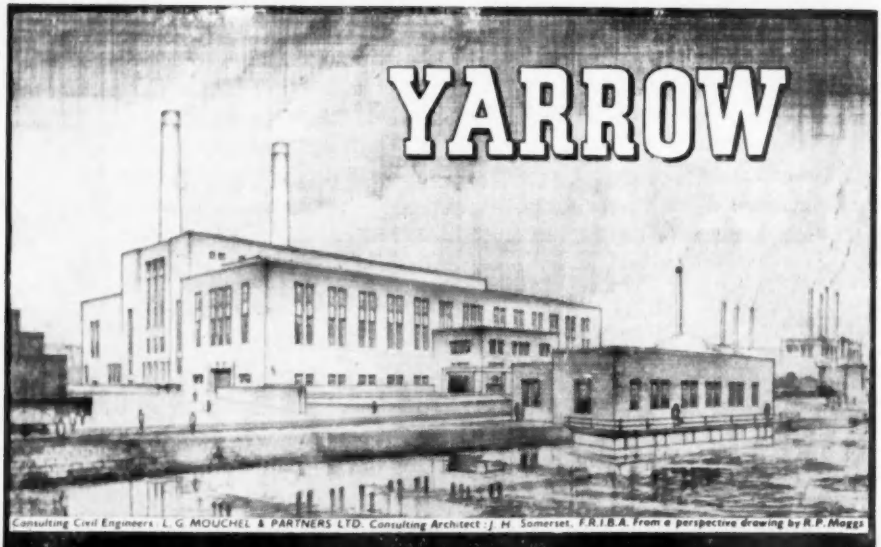

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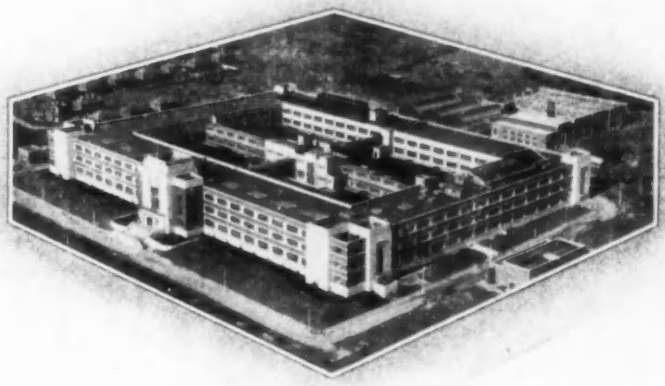

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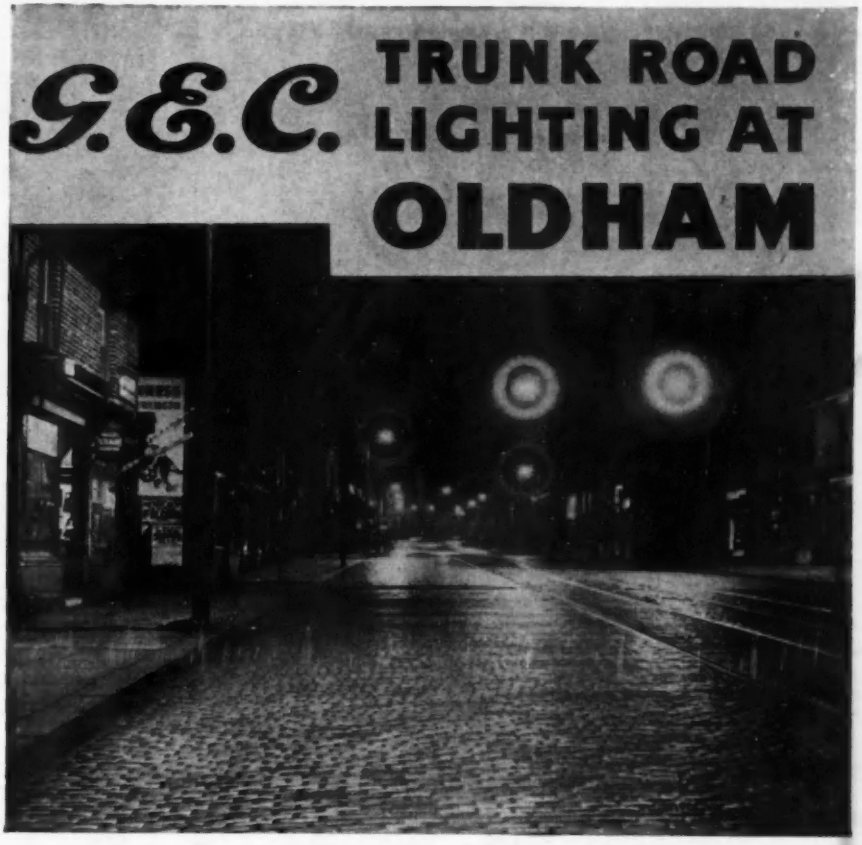

This illustration shows a portion of the A62 Trunk road at Oldham, illuminated by G.E.C. Z9425 open type lanterns with sealed refractor plates. The lanterns are fitted with 140 watt Sodium lamps.

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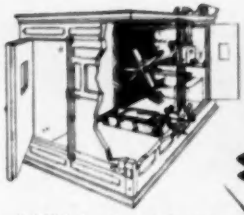

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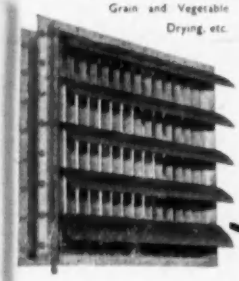

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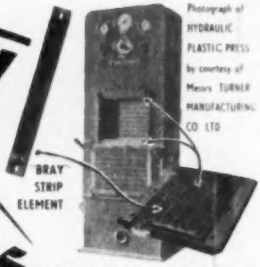

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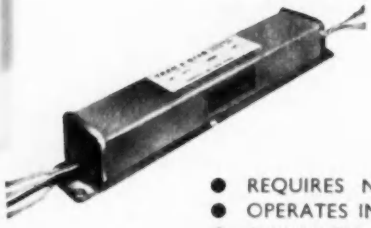

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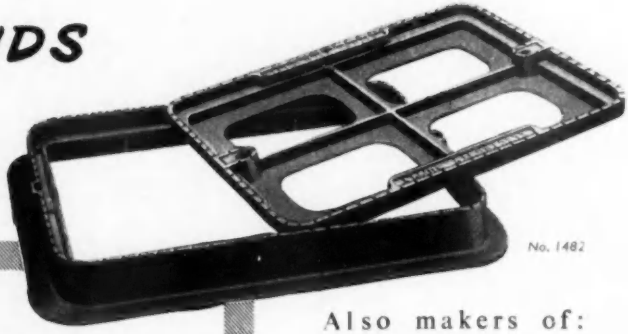

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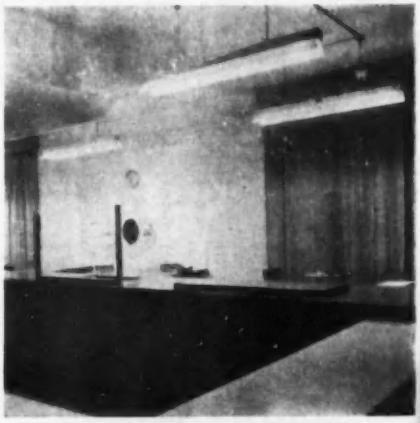

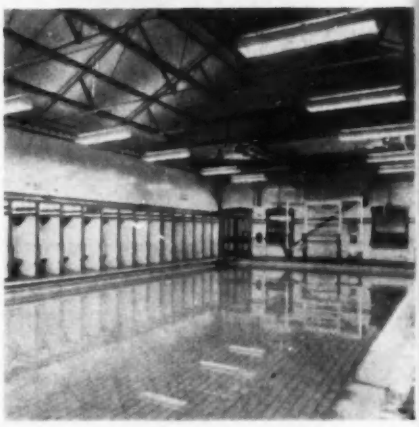

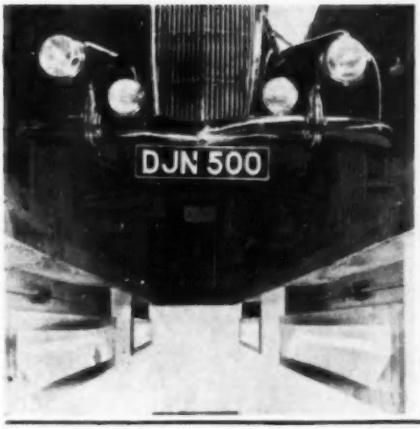

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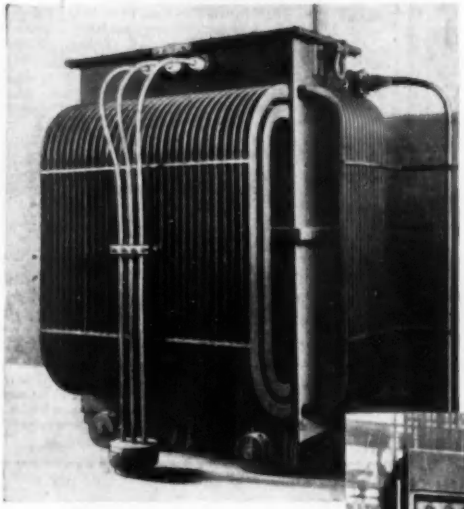

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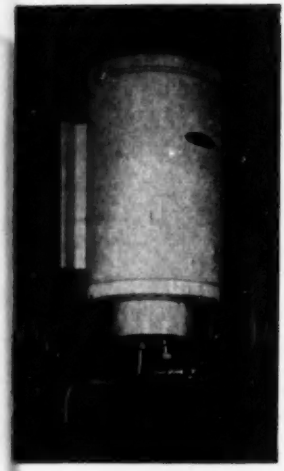

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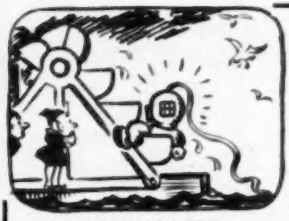

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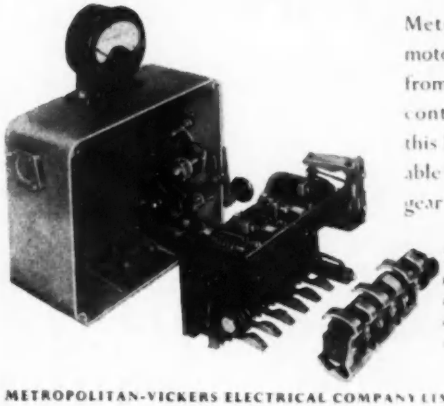

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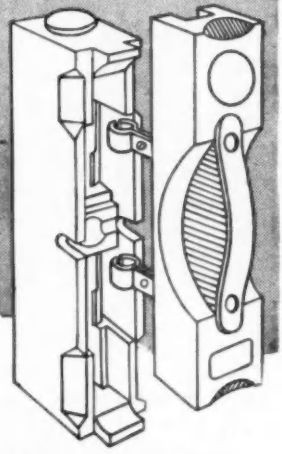

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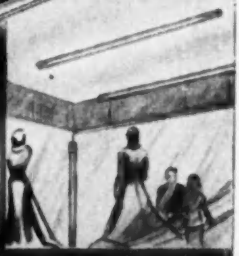

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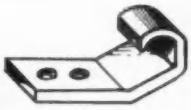

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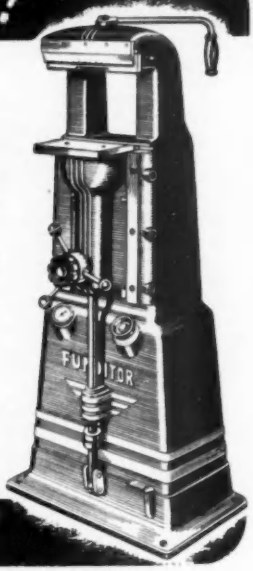

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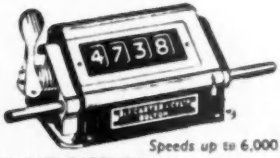

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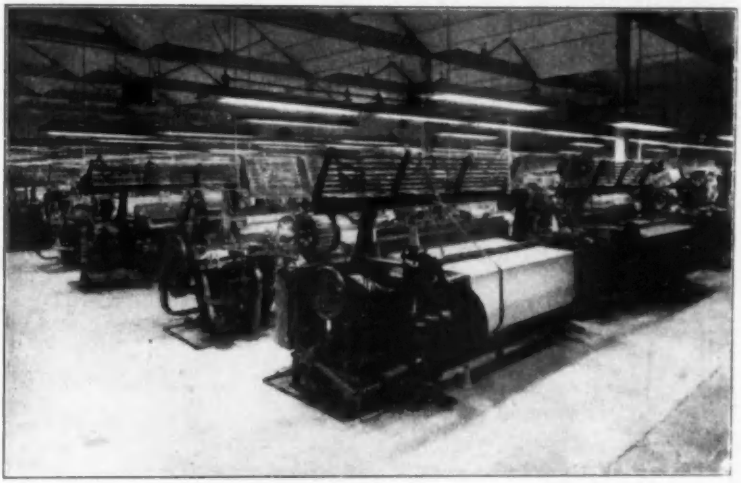

This photograph shows part of an installation of Revo "Trufolite" Reflectors in the Albion Mills of Parkland Manufacturing Co. Ltd. Nearly 500 fittings have been installed in the weaving and warping departments alone.

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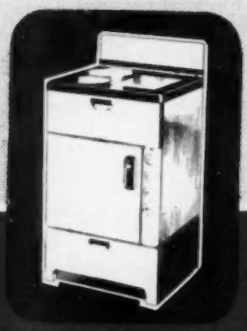
What's sunk?



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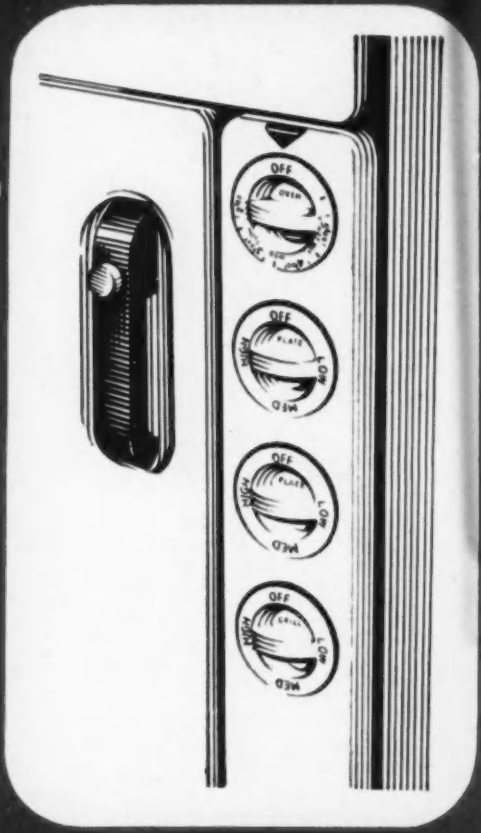

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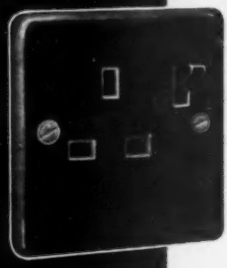

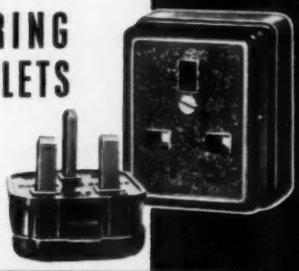

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The drawing shows the sectional arrangement of a single effect Evaporator.

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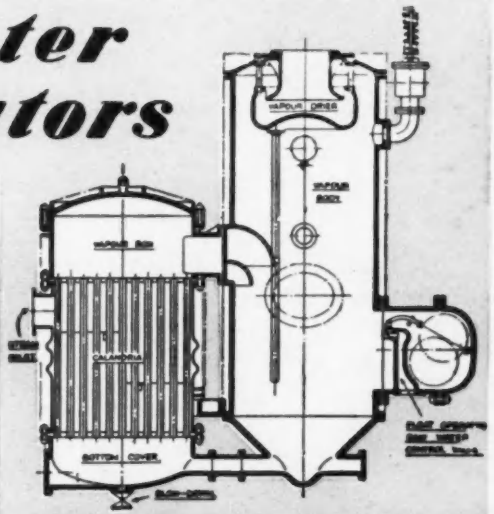

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